REMARKS

With regard to Examiner's paragraph 2, copies of 15 documents which, according to our records, were given by Lucent at the meeting are enclosed. According to Lucent and 3GPP records, there was a further document S2-000511 from Lucent, which was withdrawn. The inventor has left Lucent but according to another Lucent employee attendee at the meeting, this further document S2-000511 was possibly never submitted as it is not available on the 3GPP website or corresponding Lucent internal website. According to the 3GPP organization ETSI, it was just allocated a number and was not submitted by the author. As regards the content of this S2-000511 document, we know its title "Correction of using UDP for protecting corrupted PDU's" and that from 3GPP records it is a revision of an earlier document S2-000365, a copy of which is enclosed having the same title, a reference S2-000xxx in the top right corner of its first page, and a date of 25th January 2000.

According to our records approximately 250 other documents were given at the meeting by other parties. It is presumed that the Examiner does not wish for copies of those documents from other parties, however they are obtainable from the following web address if desired:

http://www.3gpp.org/ftp/tsg-sa/WG2.Arch/TSGS2-12/+docs/

Incidentally, it is believed that the reference to a disclosure at the meeting referred to on page 2, lines 6 to 10 of the present application relates to the Lucent document (TSGS2#12 52-000368) identified by the Examiner, see e.g. its page 8, lines 15 to 19 (Scenario II) and page 8 last line which refers to proxies.

The reference to the applicants co-pending European patent application has been completed by insertion into the specification of the European patent application no 00303898 which is published as European published patent application number EP-A-1154664. This co-pending patent application was filed on the same day, May 9, 2000, as the corresponding European patent application no. 00303897.3 from which priority has been claimed in the present application.

With regard to the Examiner's paragraph 3, the title has been amended as to be descriptive and to remove reference to "the future".

With regard to the Examiner's paragraph 4, Figures 1 and 2 have been labeled as prior art. Various clarifications have been made in the application. A new Figure 7 has been added showing the flag. It is believed that all claimed features are shown in the amended drawings.

With regard to the Examiner's paragraphs 3, 5 and 6-11, references to "future" have been deleted throughout the application. However, the claimed invention can be applied to third generation and future generation telecommunications systems. It is being described in the context of a third generation wireless telecommunications system, but the claims should not be limited thereto. The Applicant understands the objections raised in paragraphs 6 to 11 to relate to "future generations" but not the "third generation". With regard to the terms mobile terminal and remote user, these terms are well known in the field of "third generation" wireless radio networks as well as wireless communication systems in general. As mentioned above, all references to "future generations" have been removed from the application. Accordingly, it is believed that all rejections in Examiner's paragraphs 6 to 11 have been overcome.

With regard to the Examiner's paragraphs 12 to 14, the claims have been redrafted. Previous claims 1 to 9 are deleted, new claims 10 and 11 being provided in which care has been taken to ensure proper antecedent basis, appropriate use of the and said, etc. Basis for new claim 1 is provided by previous claims 1, 2 and 6 for example.

With regard to the Examiner's paragraph 15, reference to "future" has been removed as mentioned above.

The Examiner's paragraph 16 has been addressed by the amendments to the claims.

The claims have been amended to provide an independent claim 10 which clearly distinguishes over the cited Lucent reference. Claim 10 is distinguished by the following features not disclosed nor taught by the cited Lucent reference: responding to receipt of a first RSVP message by "setting a flag in Packet Data Protocol (PDP) Context data for the call session, the flag indicating the first RSVP message was received", then upon receiving back an RSVP reply message "discarding said RSVP reply message as said flag has been set in the PDP Context data". Accordingly, the rejection under 35 USC 102 falls

away. Furthermore, the Nokia document mentioned in the Examiner's paragraph 26 does not apparently disclose or teach the invention according to claim 10.

Dependent Claim 11 depends on a believed-allowable claim 10, yet provides a further distinction in that the support node senses the flag in PDP Context data which it receives and so undertakes the discarding step.

In view of the above, applicants respectfully request reconsideration and allowance. In the event of any fees inadvertently omitted or any improper payment of fees, the Commissioner is hereby authorized to charge or credit Lucent Technologies Deposit Account No.12-2325 to correct the error now or during the pendency of this application.

If the Examiner has any questions or feels that a telephone conversation would be helpful, please contact Julio Garceran at (908) 582-7294.

Respectfully submitted,

Xiaobao X Chen

By Julio Garceran

Julio A. Garceran
Attorney for Applicants
Reg. No.: 37138

Date: 11/10/04

Docket Administrator (Room 3J-219)
Lucent Technologies Inc.
101 Crawfords Corner Road
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Amendments to the Drawings

Replacement sheets for Figures 1-6 are being submitted along with a new Figure 7.

Document S2-000xxx
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

23.060 CR xxx Current Version: 3.2.1

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to: TSG#7	for approval	X	strategic		(for SMG
list expected approval meeting # here ↑	for information		non-strategic		use only)

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from:* ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]
(at least one should be marked with an X)

Source: Lucent Technologies **Date:** 25 Jan., 2000

Subject: Correction of using UDP for protecting corrupted GTP PDUs

Work item:

Category:				**Release:**		
	F	Correction	X		Phase 2	
	A	Corresponds to a correction in an earlier release			Release 96	
(only one category	B	Addition of feature			Release 97	
shall be marked	C	Functional modification of feature			Release 98	
with an X)	D	Editorial modification			Release 99	X
					Release 00	

Reason for change: The statement of "UDP provides protection against corrupted GTP PDUs" is technically inaccurate because "The protocol is transaction oriented, and delivery and duplicate protection are not guaranteed". Therefore it is suggested that the sentence "UDP provides protection against corrupted GTP PDUs." in section 5.6.1.1 should be changed to "UDP provides error detection against corrupted PDUs.".

Clauses affected: One

Other specs affected:			
	Other 3G core specifications		→ List of CRs:
	Other GSM core specifications		→ List of CRs:
	MS test specifications		→ List of CRs:
	BSS test specifications		→ List of CRs:
	O&M specifications		→ List of CRs:

Other comments:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

5.6.1.1 MS – GGSN

The user plane consists of a layered protocol structure providing user information transfer, along with associated information transfer control procedures (e.g., flow control, error detection, error correction and error recovery). The user plane independence of the Network Subsystem (NSS) platform from the underlying radio interface is preserved via the Gb interface. The following user plane is used in GPRS:

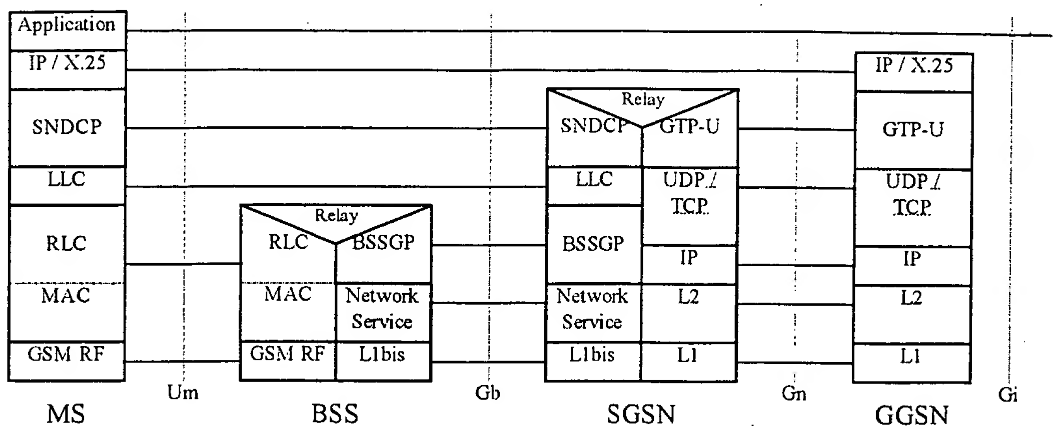

Figure 1: User Plane for GPRS

Legend:

- GPRS Tunnelling Protocol for the user plane (GTP-U): This protocol tunnels user data between GPRS Support Nodes in the backbone network. All PDP PDUs shall be encapsulated by the GPRS Tunnelling Protocol. GTP is specified in 3G TS 29.060 [26].

- UDP carries GTP PDUs for protocols that do not need a reliable data link (e.g., IP), UDP provides ~~protection~~ error detection against corrupted GTP PDUs. UDP is defined in RFC 768 [39].

- IP: This is the backbone network protocol used for routeing user data and control signalling. The backbone network may initially be based on the IP version 4 protocol. Ultimately, IP version 6 shall be used. IP version 4 is defined in RFC 791.

- Subnetwork Dependent Convergence Protocol (SNDCP): This transmission functionality maps network-level characteristics onto the characteristics of the underlying network. SNDCP is specified in GSM 04.65 [16].

- Logical Link Control (LLC): This layer provides a highly reliable ciphered logical link. LLC shall be independent of the underlying radio interface protocols in order to allow introduction of alternative GPRS radio solutions with minimum changes to the NSS. LLC is specified in GSM 04.64.

- Relay: In the BSS, this function relays LLC PDUs between the Um and Gb interfaces. In the SGSN, this function relays PDP PDUs between the Gb and Gn interfaces.

- Base Station System GPRS Protocol (BSSGP): This layer conveys routeing- and QoS-related information between BSS and SGSN. BSSGP does not perform error correction. BSSGP is specified in GSM 08.18 [21].

- Network Service (NS): This layer transports BSSGP PDUs. NS is based on the Frame Relay connection between BSS and SGSN, and may be multi-hop and traverse a network of Frame Relay switching nodes. NS is specified in GSM 08.16 [20].

- RLC/MAC: This layer contains two functions: The Radio Link Control function provides a radio-solution-dependent reliable link. The Medium Access Control function controls the access signalling (request and grant) procedures for the radio channel, and the mapping of LLC frames onto the GSM physical channel. RLC/MAC is defined in GSM 04.60 [14].

- GSM RF: As defined in GSM 05 series.

TSG SA2 #12 Tdoc S2-000366
Tokyo, Japan, 6 - 9 March 2000

Title: Architectural principles for R'00

Source: Lucent Technologies Inc.

Agenda item: 6 (R00)

Aim: Modification of the R'00 TR **(23.821)**

Author :
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Abstract : This paper discusses architectural requirements and architectural principles for Release 2000. A companion paper discusses the architecture model.

1 Introduction

At the SA2#11 meeting it was agreed that architectural principles should be settled before doing further work on the R'00 architecture. The paper from Alcatel served to initiate discussions on this topic. This paper progresses work on this topic by discussing the principles in relation to the requirements.

References used in developing this paper are:

[1] Input Document S2-000153 from Alcatel to the SA#11 meeting

[2] TR 23.821 V0.1.0 (2000-01), output of SA#11 meeting, "Architecture Principles for Release 2000"

[3] TR 23.922 V1.0.0 (1999-10), the feasibility study on "Architecture for an All-IP network"

[4] TR 22.976 V0.5.0 (2000-01) "Study on PS domain services and capabilities"

2 Discussions

It is important that the architectural principles relate directly to the architectural requirements. Therefore it is suggested that first we clarify what are the requirements, then discuss and agree on the architecture principles. It is also suggested that we define the TR 23.821 terminology as we go along. Some definitions are proposed here, ~~s~~See the companion paper for a list of other proposed definitions.

2.1 Some definitions

Architectural requirements: These are requirements that should be supported by the network architecture. They include user services, operator needs, and some other industry needs such as network evolution and regulatory needs.

Architectural principles: These are the high level decisions that are used in developing the detailed architecture of a specific network. They include choice of network topology to handle user traffic and signalling traffic, identification of major functional subsystems and interfaces, modularity of functions within each subsystem, functional layers (sometimes referred to as domains) which represent peer-to-peer functions across subsystems.

~~**Architecture model**: This is the general model of a telecommunication network to represent the fundamental principles that apply to all networks. Such a model is then customised to show the principles being adopted specifically for R'00.~~(duplication with paper 2)

2.2 The architectural requirements

TR 23.922 is currently a convenient source of information on all architectural requirements. Full details of user services are currently being developed in TR 22.976. Detailing of other architectural requirements is not being done in any specific place. The Alcatel paper includes a few architectural requirements. To help understand the architectural requirements within TR 23.821 it is worthwhile to capture a summary of the architectural requirements.

Although the focus here is generally on the requirements that are new for R'00, the R'99 requirements should also be considered when finalising the architectural principles.

2.2.1 User services

These are the services and service quality as perceived by the end-users. End-users include corporations. Refer to TR 22.976 for the user services.

2.2.2 Operator needs

These are the needs for network planning, deployment/provisioning and operation. Such needs are generally transparent to end-users.

- Deliver all 3G services using a common network that makes use of packet technology and is evolved from current 3G architectures (R'99, IMT-2000). The traffic should be supported in the most efficient and economical way.
- Support multiple means of access, namely 3G radio access technologies (GERAN, UTRAN, EDGE/GPRS), conventional wireline, coax/fiber cable, LANs.
- For radio access, allow efficient use of radio resources and multiplexing of multiple traffic streams on the same radio link.
- Signalling traffic and user traffic should be routed for optimum use of resources and performance.
- It shall be possible for numbering and addressing, and routing to be based on a single identifier. Both dynamic and dedicated IP addresses shall be supported.
- Charging: traffic log etc. consider any additional requirements that may be needed for 3G services.

2.2.3 Other industry needs

These are the broader needs of industry, including those of equipment vendors and regulators.

- Allow independent evolution of circuit switched and packet switched infrastructures so that individual networks may have a choice of evolution paths and deployment.
- Support service offerings being independent from transport technology, so they can evolve independently
- Maintain independent evolution of radio dependent parts in the RAN and radio independent parts in the CN.
- Allow a smooth evolution from hybrid networks to future converged networks in future releases.

2.3 The architecture principles for R'00

The following architecture principles are proposed for R'00. They need to be considered together with architecture principles from R'99 when developing the R'00 architecture.

1) **Need both circuit-mode and packet-mode domains**

   - Considering the traffic mix resulting from the set of 3G services and the need for flexible evolution paths, it is necessary to have separate circuit switched domain (based on current wireless networks) and packet switched domain (based on the current IP network).

- Each domain will handle its own signalling traffic, switching and routing.

2) Keep network functions separate from radio access functions

- The same network should support a variety of access choices, and access technologies may evolve further. Therefore network functions such as call control, service control, etc. should remain separate from access functions and ideally should be independent of choice of access. This implies that the same CN should be able to interface with a variety of RANs.
- See also principle 4 on mobility functions.

3) Separate functions that are likely to evolve independently

The following are examples of major functions that may need to evolve independently and would therefore benefit from being separate entities in the architecture model. Further discussions are needed to establish an agreed list.

- Bearer control in both access and network
- Call control for circuit-mode services, call state model
- Session control for packet-mode services
- Mail services control
- Multimedia control for multimedia sessions
- Switching and routing
- Service control and service capabilities, VHE for roamers
- Service features and applications
- Mobility management and location-based services, mobility state model
- Security functions

4) Break down mobility management into a set of independent functions

Mobility management will be a complex function in R'00. By breaking it down into independent components it will become more manageable. The list below is a suggested breakdown:

- Macro Mobility : Location of the terminal in terms of the network that they are in. The terminal may be within any wireless or fixed network. This would be tracked within the UMS function of the HSS.
- Micro mobility: Location management and management of the terminal as it moves within a particular network.

5) Separate data storage into the following:

Data storage entities may be needed in different numbers and/or different configurations. Separation of data storage into some major categories as listed below, provides that flexibility.

- Location data and authentication data, this may apply only to mobile users
- Service data, charging data, encryption, this may apply to both fixed and mobile users
- USIM data (this is data which is stored within the USIM)
- OA&M data, for both circuit-mode and packet-mode
- Store and forward mail services
- Store and forward for content servers e.g. websites

6) Allow for evolution of numbering and addressing

- This is necessary since IP addressing capacity and IP routing may evolve for the packet switched domain. There may be a partial dependence between addressing and routing to allow routing shortcuts.
- Telephone numbering plan will continue in the circuit switched domain.

7) **Minimize transcoding of traffic**

- This is done to improve end-to-end transmission quality and to facilitate QoS control functions.

8) **Minimize redundant traffic over the radio interface**

- This is necessary since radio resources are always scarce. Techniques may include stripping packet headers over radio links to save radio resources. Seek maximum occupancy of radio bearers with packet multiplexing.
- Minimize signalling traffic between user and network.
- Minimize need for re-transmissions between user and network.

3. Proposals

It is proposed to revise TR23.821 version 0.1.0 by using material given in sections 1 and 2 above, and adapting appropriately for inclusion in the TR:

- *Section 2: Add references listed in section 1 above.*
- *Section 3: Add definitions given in section 2.1 above.*
- *Add a new section 5 "Architectural requirements" and renumber subsequent sections. Put section 2.1 above into the new section 5.*
- *Section 5: Renumber as section 6: Put section 2.2 above "The architecture principles for R'00" into a separate subsection.*

TSG-SA Working Group 2 meeting #12
Tokyo, Japan, 6th – 9th March 2000

TSGS#212 S2-00036

Source: Lucent Technologies

Title: Terminology for Describing UMTS QoS Policies

Document for: Approval

Agenda Item: R00

1. Introduction

The basic assumption for any QoS scheme to work is that a user/application must have sufficient permission to request and receive its QoS guarantees. The basic principles and requirements as well as the work items of supporting QoS control policies in UMTS have been identified in the last 3GPP S2 meeting (24-28 Jan. 2000). One of the key requirements has been achieving agreement on a generic definition of UMTS QoS policies that apply to the UMTS QoS services. In addition to QoS Policies, there are different policies such as security, address management, network topology management and routing policies to name a few, the definition of UMTS QoS Policies refers to the policies that apply to the UMTS QoS control, specifically, the rules and conditions that govern the access to the UMTS network resources that are allocated and managed to deliver the user and/or application requested specific QoS. It is recognized that the defined UMTS QoS Policies and the associated UMTS QoS Framework should

- allow efficient use of UMTS network resources, in particular, the radio resources across the air interface between the mobile terminal and the radio access network.
- support existing and future QoS control mechanisms in both radio access network and the core network.
- be generic and flexible to support different vendors' UMTS networking equipment and operators' service requirements.
- inter-operate with the generic QoS Policies models that are deployed in the external networks.

This document aims to provide an analysis of some application scenarios for UMTS QoS Policies and then proposes a UMTS QoS Policy definition for R00 for approval by S2. The definition of the UMTS QoS Policy is intended to be generic enough to be applicable to different vendors' QoS provisioning mechanisms, different the operators' bilateral/multi-lateral service requirements and suitable for different user/application specific QoS requests. This document intends to facilitate the definition of a UMTS QoS Policy framework.

2. The Level of Abstraction of UMTS QoS Policy Definition

There are can be different levels of abstraction for the UMTS QoS Policy definition. The definition can be of a high level abstraction such as the policies that define the service level agreements. For example, the UMTS QoS Policy can be defined broadly as the administratively prescribed rules and the conditions that are used to govern the bilateral service access between different operators' domains by specifying that traffic from operator B's UMTS network domain to the local domain of operator A's can use up to 20% of the capacity of the operator A' total network links to the external networks, regardless of the specific services classes and their QoS requirements of the traffic from

the operator B. This business level abstraction of UMTS QoS policy, in general, provides a rule for the UMTS resource access between different network operators.

On the contrary, a QoS control policy can be as specific as being applied to per-user or per-device. For example, a user QoS policy can set the resource access rule as that the traffic from User A running an application of Conversational QoS Class is entitled an DSCP value up to 7 and the maximum bit rate of 1.5 Mbps. This user-specific QoS control policy controls a user and/or an application's access right to the UMTS network resources within an operator's domain. A per-network device QoS Policy can define the queueing management policy to be that a system warning message is generated and sent to the QoS Policy Control Element (e.g. the Policy Decision Point) if the queue depth is filled up to 90% of the total length.

In general, different levels of abstractions should be accommodated in the definition of UMTS QoS Policies. In addition, differences in terms of QoS policy application scenarios, resource cost, utilization and the access mechanisms also need to be reflected in the definition but expressed at different abstraction levels that can subsequently be classified into different QoS Policy categories.

3. The Definition of UMTS QoS Policies

A UMTS QoS policy, in general, is defined as a set of administratively prescribed and negotiated rules and agreements that are enforced to control the access to the resources related to the QoS provisioning in UMTS networks as well as between UMTS networks and the external netowrks.

A UMTS QoS policy can be taken as a function with parameters, e.g. user/domain identity, QoS requirement, time-of-the day, etc. that are combined with certain rules and conditions applied to generate an unambiguous response to a certain resource access/reservation request. To reflect different levels of abstraction for the definition, while in the mean time, maintain the basic requirements identified in Section 1 and 2, UMTS QoS Policies can be classified into following categories. To better explain the QoS Policy categories, the service types, such as the Guaranteed Service and the Controlled Load Service, of Integrated Services QoS Framework and DiffServ QoS Framework of IETF are used. The proposed QoS Policy categories are intended to apply to other QoS Frameworks as well.

(1) Service Driven QoS Policies:

Service Driven QoS Policies are defined to be the QoS Policies that are defined and enforced according to the QoS Service Classes (Conversational, Streaming, Interactive and Background Classes) defined in TS23.107. A Service Driven QoS Policy applies to the resource reservation requests from all the users/applications that require the same QoS Class even when they are located in different operators' domains using different vendors' network equipment. A Service Driven QoS Policy can be subsequently derived from the Service Level Agreement (SLA) between the users and their service providers and between service providers. A resource reservation request that is governed by Service Driven QoS Policies is expected to be processed in the same way and, if it is accepted, achieve the same QoS delivering behavior, regardless of the identity and location of the user and the different operational domains of operators.

Service Driven QoS Policies aim to facilitate the achievement of consistent and unified end-to-end resource access and reservation control for the same type of services across different UMTS administrative domains. As an example, the Service Driven QoS Policies derived from the bilateral or multi-lateral SLAs between different Service Providers (SPs) decide that a user that

intends to initiate a VoIP call of the Conversational QoS Class should expect the same services and thus the consistent call quality when he roams to networks operated by different operators, unless the user is entitled for different levels of services, e.g. as a premium user in one operator's domain and an economy user in all other domains.

(2) User/Application Driven QoS Policies:

User/Application Driven QoS Policies aim to differentiate the UMTS resource access, resource reservation and thus the level of QoS based on the identity of the user and/or the nature of an application. Users and their applications under different SLAs signed with their SP's are entitled for different QoS policies and thus will be treated differently in terms of the eligible resource reservation, the level of QoS and charging rates, etc. As an example, user A, if identified as an economy user in its SLA with its SP, is allowed Guaranteed Services only during the off-peak hours. It is only allowed Controlled Load Service or Best-Effort Service during the peak hours, regardless of its location and the nature of the applications (Conversational, Streaming, Interactive and Background Services) it is running. An example for application driven QoS Policies is that all calls to the Tourist Information Office will be provided only Controlled Load Service during the off-peak hours and the Best-Effort Service during the peak hours.

User Driven and Application Driven QoS Policies can be combined to generate the appropriate QoS Policies in some application scenarios. Take the same user, A, in the above example. An emergency call from all users, including user A, shall be given the Guaranteed Services even during the peak hours.

(3) Network Driven QoS Policies

Network Driven QoS Policies are referred to the policies that decide the resource access, allocation and reservation, specifically, for Capacity and Call Admission Control, in each UMTS QoS network element including UE, UTRAN, the Edge Node (SGSN) and Gateway Node (GGSN). The semantics of the Network Driven QoS Policies are network element dependent. For example, UTRAN interprets and implements the QoS Policies based on radio specific resource access allocation and reservation requirements that are different from the QoS Policies implemented in the Core Network (SGSN/GGSN). In addition, different Network Driven QoS Policies mechanisms need to be implemented for different QoS Frameworks and the QoS signaling such as the RSVP/IntServ and DiffServ that deploy different QoS control mechanisms.

For those network elements such as UTRAN/SGSN/GGSN that deploys DiffServ QoS model, the network edge node(s) and the core network node(s) are the two primary locations where the QoS Policies are applied. Specifically at the core network nodes, the main QoS Policies are about those on accessing the resources (queue/class allocation) while at the edge nodes, the QoS Policies for those additional functionality such as flow classification, policing, RSVP message processing (mapping), remarking and billing, etc, should be taken into account.

As a simple example, a Network Driven QoS Policy for allocating the GTP tunnel between the SGSN and GGSN that deploy the DiffServ QoS Framework mandates that all user packets are marked with a DSCP value of no higher than 7 except for those packets for network control and management signaling.

In comparison, a QoS control Policy for an RSVP capable network element makes it imperative that any specific bandwidth reservation request as carried by the RSVP messages (e.g. RESV) shall not exceed the Maximum Bit Rate of 1500 kbps.

(4) Mutual Dependencies of UMTS QoS Policies

The three UMTS QoS Policy categories are not orthogonal to each other. A UMTS QoS Policy decision may well be the result of combining a number of policies that belong to different categories. Each type of policy may generate a specific response to the same UMTS resource access and reservation request but decisions derived based on the policies from different categories should not contradict each other. This unambiguity of UMTS QoS Policy decisions must be guaranteed through an appropriate management of the QoS Policy Entities in a UMTS QoS Policy Framework.

(5) Other QoS Policy Dependencies

The three categories of UMTS QoS Policies may also have other dependencies such as the temporal and geographical dependencies. A QoS Policy may be dynamically adapted according to the time-of-the day and the change of the user location and therefore, result in different responses to the same resource access/reservation request.

4. Proposal

It is proposed that the following text is included in Section 9 "QoS" of TR 23.821.

The General Requirements for UMTS QoS Policy Control

UMTS QoS Policies, the UMTS QoS Framework and the UMTS QoS Policy control mechanisms should

- allow efficient use of UMTS network resources, in particular, the radio resources across the air interface between the mobile terminal and the radio access network.
- support existing and future QoS control mechanisms in both radio access network and the core network.
- be generic and flexible to support different vendors' UMTS networking equipment and operators' service requirements.
- inter-operate with the generic QoS Policies models that are deployed in the external networks.

The UMTS QoS Policies

A UMTS QoS policy is defined as a set of administratively prescribed and negotiated rules and agreements that are

enforced to control the access to the resources related to the QoS provisioning in UMTS networks as well as between UMTS networks and the external netowrks.

A UMTS QoS policy can be taken as a function with parameters, e.g. user/domain identity, QoS requirement, time-of-the day, etc. that are combined with certain rules and conditions applied to generate an unambiguous response to a certain resource access/reservation request. To reflect different levels of abstraction for the definition, while in the mean time, maintain the basic requirements UMTS QoS Policies can be classified into following categories. The UMTS QoS Policies and the associated control mechanisms shall support generic QoS frameworks such as Differentiated Services QoS Framework of IETF.

(1) Service Driven QoS Policies:

Service Driven QoS Policies are defined to be the QoS Policies that are defined and enforced according to the QoS Service Classes (Conversational, Streaming, Interactive and Background Classes) defined in TS23.107. A Service Driven QoS Policy applies to the resource reservation requests from all the users/applications that require the same QoS Class even when they are located in different operators' domains using different vendors' network equipment. A Service Driven QoS Policy can be subsequently derived from the Service Level Agreement (SLA) between the users and their service providers and between service providers. A resource reservation request that is governed by Service Driven QoS Policies is expected to be processed in the same way and, if it is accepted, achieve the same QoS delivering behavior, regardless of the identity and location of the user and the different operational domains of operators.

Service Driven QoS Policies aim to facilitate the achievement of consistent and unified end-to-end resource access and reservation control for the same type of services across different UMTS administrative domains.

(2) User/Application Driven QoS Policies:

User/Application Driven QoS Policies aim to differentiate the UMTS resource access, resource reservation and thus the level of QoS based on the identity of the user and/or the nature of an application. Users and their applications under different SLAs signed with their SP's are entitled for different QoS policies and thus will be treated differently in terms of the eligible resource reservation, the level of QoS and charging rates, etc. User Driven and Application Driven QoS Policies can be combined to generate the appropriate QoS Policies in some application scenarios.

(3) Network Driven QoS Policies

Network Driven QoS Policies are referred to the policies that decide the resource access, allocation and reservation, specifically, for Capacity and Call Admission Control, in each UMTS QoS network element including UE, UTRAN, the Edge Node (SGSN) and Gateway Node (GGSN). The semantics of the Network Driven QoS Policies are network element dependent. For example, UTRAN interprets and implements the QoS Policies based on radio specific resource access allocation and reservation requirements that are different from the QoS Policies implemented in the Core Network (SGSN/GGSN). In addition, different Network Driven QoS Policies mechanisms need to be implemented for different QoS Frameworks and the QoS signaling such as the RSVP and DiffServ that deploy different QoS control mechanisms.

For those network elements such as UTRAN/SGSN/GGSN that deploys DiffServ QoS model, the network edge node(s) and the core network node(s) are the two primary locations where the QoS Policies are applied. Specifically at the core network nodes, the main QoS Policies are about those on accessing the resources (queue/class allocation) while at the edge nodes, the QoS Policies for those additional functionality such as flow classification, policing, RSVP message processing (mapping), remarking and billing, etc, should be taken into account.

(4) Mutual Dependencies of UMTS QoS Policies

The three UMTS QoS Policy categories are not orthogonal to each other. A UMTS QoS Policy decision may well be the result of combining a number of policies that belong to different categories. Each type of policy may generate a specific response to the same UMTS resource access and reservation request but decisions derived based on the policies from different categories should not contradict each other. This unambiguity of UMTS QoS Policy decisions must be guaranteed through an appropriate management of the QoS Policy Entities in a UMTS QoS Policy Framework.

(5) Other QoS Policy Dependencies

The three categories of UMTS QoS Policies may also have other dependencies such as the temporal and geographical dependencies. A QoS Policy may be dynamically adapted according to the time-of-the day and the change of the user location and therefore, result in different responses to the same resource access/reservation request.

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1. 3G TS 23.107 3.0.0 (1999-10), "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects QoS Concept and Architecture" (3G TS 23.107 version 3.0.0).
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TSG-SA Working Group 2 meeting #12
Tokyo, Japan, 6th – 9th, March 2000

TSGS2#12 S2-000368

Agenda Item: R00

Source: Lucent Technologies

Title: Supporting RSVP applications in UMTS network
Document for: Decision

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1 INTRODUCTION

RSVP is one of the possible mechanisms used by an application in the TE to negotiate QoS and activate IP QoS control. The RSVP signaling protocol may be used for the QoS control in the local IP access network, or it may be used end-to-end across IP networks.

For the case where RSVP is used to perform QoS control in the local IP access network, RSVP signaling will be terminated at the MT and PDP context procedures will be used for UMTS control in the UMTS network.

In addition, RSVP signaling may be used in an end-to-end mode. In this mode, TE and its remote peer running RSVP (located within the external network) will exchange RSVP signaling messages to set up RSVP sessions. Periodic RSVP refresh messages are used to maintain the RSVP sessions. But such periodic transmission of RSVP messages increases the traffic load within UMTS networks, in particular, over the air interface.

The general requirements for supporting RSVP applications in UMTS network are:

- No change to standard RSVP applications
- No or minimal impact on existing UMTS network architecture, and QoS control procedures.
- Minimize any extra signaling traffic associated with supporting RSVP applications.

In this document, we describe two application scenarios where RSVP is used to negotiate QoS and activate QoS control across UMTS networks. The two scenarios are:

Scenario I: RSVP signaling is terminated at the MT only

Scenario II: RSVP signaling is terminated at both MT and GGSN only.

The advantages with this function performed at the MT are summarized:

- The MT can be upgraded quicker to cater for new features in the QoS control API.
- Allows access independent API at the application level.
- Allows interface specific controls to override non-interface specific settings for non-mobile aware applications.
- Allows tight customer control of expensive radio resources
- Allows appropriate control of the radio access regardless of whether it is an IP service or a PPP service being provided.
- The MT under the control of the end application can determine by using RSVP whether to modify an existing PDP context or create a new PDP context to provide the QoS needs of each RSVP session.

In contrast to the approach proposed in [1] for the end-to-end mode, it is proposed to include the general requirements on supporting some generic non-UMTS QoS signaling schemes such as RSVP and the schemes to restrict the processing of RSVP, or in general, the non-UMTS QoS signaling message at the edge of UMTS network by using the PDP context request/response messages.

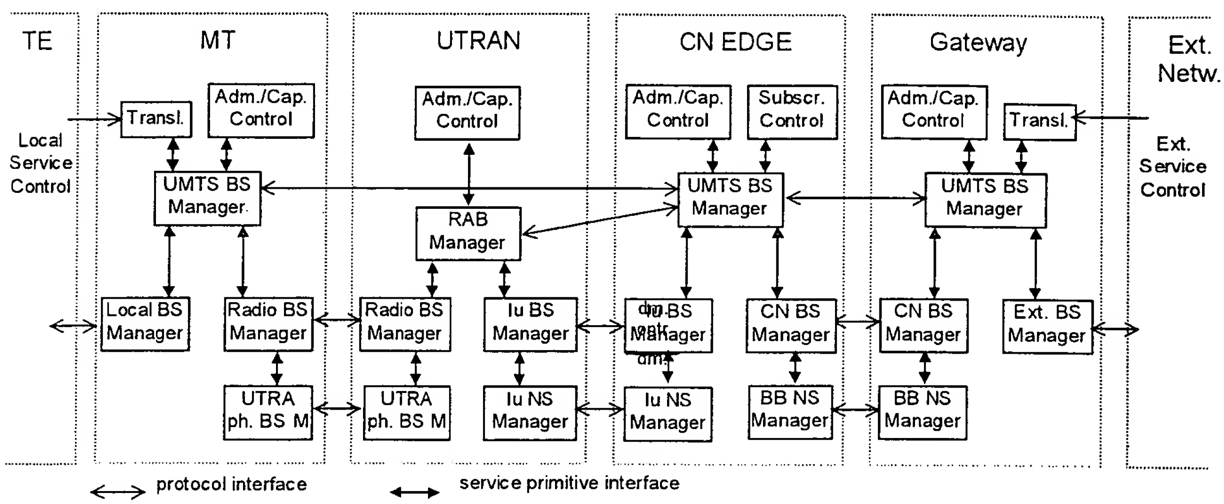

Figure 1: QoS management functions for UMTS bearer service in the control plane

When the application is using RSVP to control QoS at the IP level, the MT must examine the RSVP messages to gather information about the application's QoS requirements. The MT may then override/modify the QoS parameters according to the user specific configuration. The resultant parameters are then used to activate and/or modify the PDP context to support that QoS request. Note that MT is also required to check if the RSVP messages are (a) sent/received the first time so as to initiate PDP context setup, (b) modified in order to initiate PDP context modification procedure) or (c) merely refresh messages to trigger local generation of responses.

An RSVP processing entity -within the MT will receive and act on the RSVP signaling. It is a local configuration decision whether the MT will

1. Intercept the RSVP signaling, process and relay RSVP messages
2. Intercept the RSVP signaling, and initiate an RSVP proxy to improve the reliability and efficiency of RSVP across the radio interface.

These two scenarios are depicted in the figures below, for the uplink/downlink cases where the PATH message is received from the TE (for uplink traffic QoS control) , and from the external network (for the downlink Traffic QoS control).

Note: The two scenarios assume the termination of RSVP signaling in MT. The functional split between MT and TE is a local configuration, other functional split of the MS/UE shall therefore also be possible.

2 SUPPORTING RSVP IN UMTS

2.1 SCENARIO 1: MT TERMINATED RSVP

It is recognized that Scenario 1 is applicable for an MS/UE using RSVP to communicate with a Non-RSVP application in either an MS or a fixed terminal .In this scenario, the RSVP signaling is terminated at MT as shown in Figure 2.

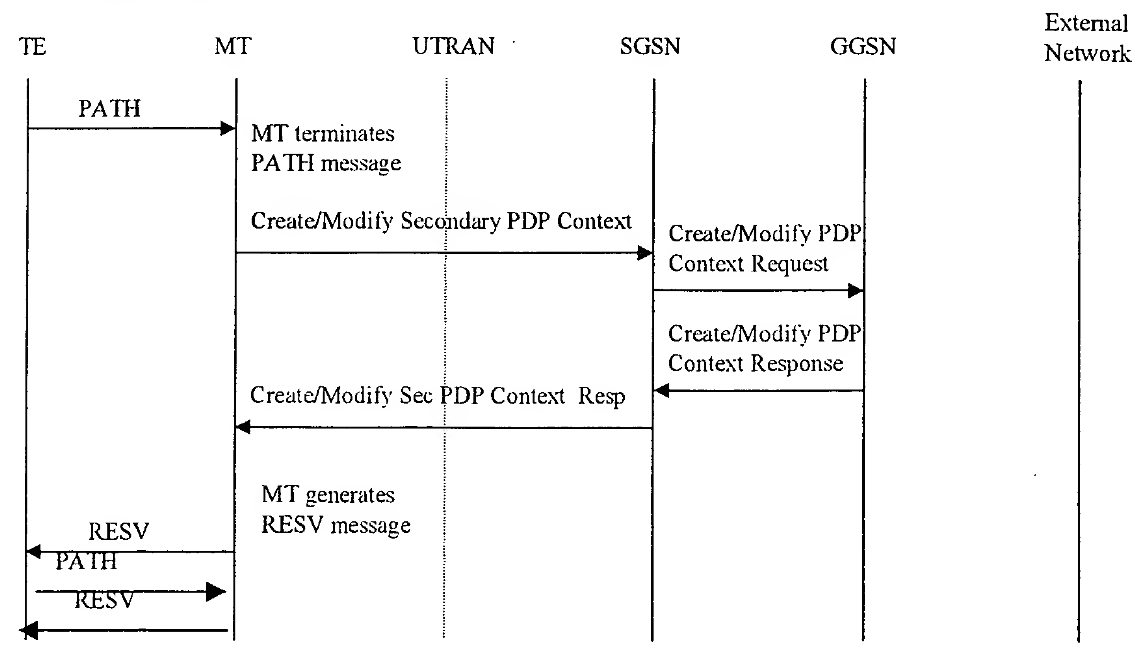

Figure 2: MT Terminated RSVP: TE as the RSVP sender

For the traffic QoS control in the uplink direction as shown in Figure 2, when the PATH message is received from TE, the MT analyzes the RSVP parameters carried in the PATH message, and determines whether to create a new secondary PDP context, or to modify an existing one for an updated QoS status. The secondary PDP context is then created/modified using the existing PDP Context Control procedures. If the PATH message is a first-time PATH message, a new secondary PDP context needs to be created. If the PATH message is a refresh message with no modified QoS parameters, then no action will be taken (no PDP context modification is required). MT will generate the refreshed RESV message to the TE.

Upon successful establishment of a secondary PDP context, the MT can instantiate an RSVP proxy to terminate RSVP signaling messages. In this mode, the RSVP proxy is responsible for receiving and processing the PATH message(s), and generating the RESV message(s) as a response.

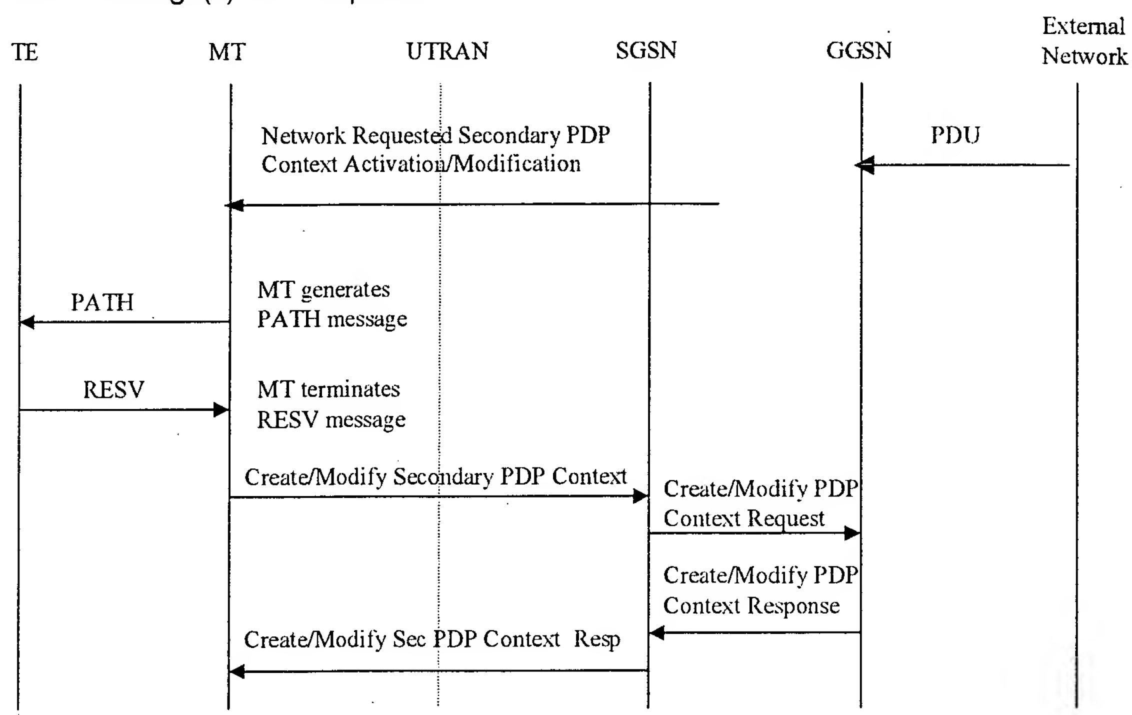

Figure 3: MT Terminated RSVP: External IP Host as the sender

We assume that RSVP is used by MT/TE to reserve local IP access network resource. For the traffic QoS control in downlink direction as shown in Figure 3, in order to initiate the RSVP PATH message for the TE, the RSVP Processing Entity at the MT needs to be triggered as a result of either receiving network initiated secondary PDP context modification requesting for an updated QoS or network-requested PDP Context Activation. GGSN will initiate the network initiated PDP context procedure if it receives a PDU.

As a response to the PATH message sent from MT, the TE sends an RESV message to the MT which, in turn, decides if a secondary PDP context should be modified or created.

Scenario 1 can also be used for the case where an RSVP-capable TE communicates with an RSVP-capable host in external network. In that case, all RSVP control messages will be intercepted by MT assuming that primary PDP context (best-effort context) is set up between MT/GGSN for this communication. MT will then do the secondary PDP context negotiation. So GGSN does not have to interpret RSVP control messages.

2.2 SCENARIO 2

In this scenario, the RSVP session is used end-to-end and terminated at the MT and the GGSN. The assumption is that the TE intends to set up RSVP session with its remote peer that also uses RSVP signaling in the external network. Figure 4 shows the RSVP activated QoS Control in the uplink direction.

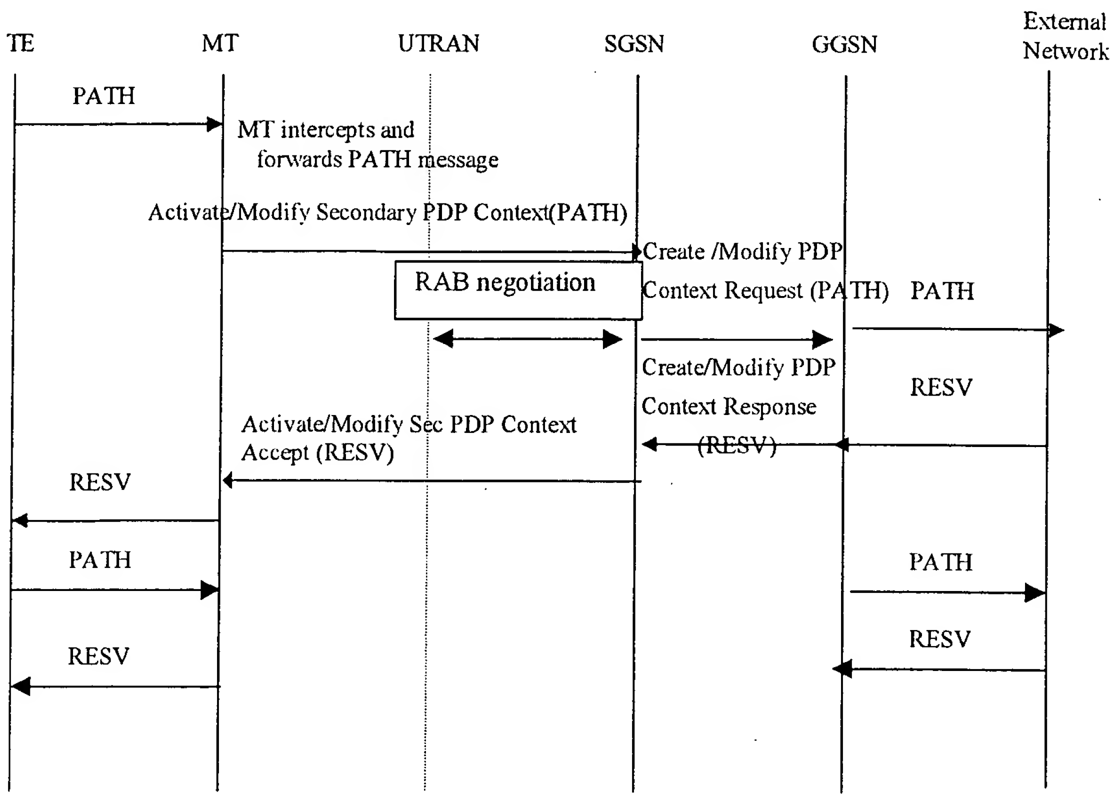

Figure 4: MT and GGSN Terminated RSVP: TE/MT as the RSVP sender

In this scenario, when the MT receives the PATH message from TE, MT checks to see if a PDP context exists for this RSVP session. If it does, MT triggers the Modify/Create SecondaryPDP context message if there is a change in QoS parameters or if a secondary PDP context needs to be created. The PATH message is piggybacked on the Activate/Modify PDP context Request messages using the PDP config. option. (Note that an alternative solution is to extract the Traffic Specs such as the Tspec, ADSpec from the PATH message and piggyback them using the PDP config. option to the Activate/Modify PDP Context Request messages). Alternatively, the PATH message can be sent as regular network PDU using the existing primary PDP context. Note that MT is

expected to populate the Requested QoS IE based on the PATH information. SGSN can use the information within the Requested QoS IE to do RAB negotiation with UTRAN. The PATH message will be relayed to GGSN. The GGSN extracts the PATH message and then relays it to the external network.

Note that GGSN can generate the PDP context response without waiting for the RESV message. However, with that approach, GGSN may not be able to populate the Negotiated QoS IE with values that matches RESV QoS requirements. Figure 4 shows that the GGSN waits for RESV before generating the PDP context response message.

When the RESV response is received at the GGSN, it uses this information, along with relevant local configuration, to see if QoS Negotiated is the same as QoS Requested. Then it piggybacks the RESV message on the Activate/Modify PDP Context response message using the PDP config. option. RAB re-negotiation can take place between SGSN and UTRAN if QoS Negotiated is different from QoS Requested. Finally the RESV message possibly adapted at the GGSN is sent on to the TE by piggybacking on the Activate /Modify -PDP Context Confirmation message(s). This proposed piggybacking of RSVP messages/Traffic &QoS Data Objects on PDP Context control messages aims to speed up the end-to-end QoS negotiation process.

Note that the current PDP context procedure as discussed in 23.060 mandates SGSN to perform RAB negotiation upon receiving the PDP context request message. For the scenarios where end-to-end QoS is negotiated using RSVP, such procedures mean SGSN may need to do RAB re-negotiation.

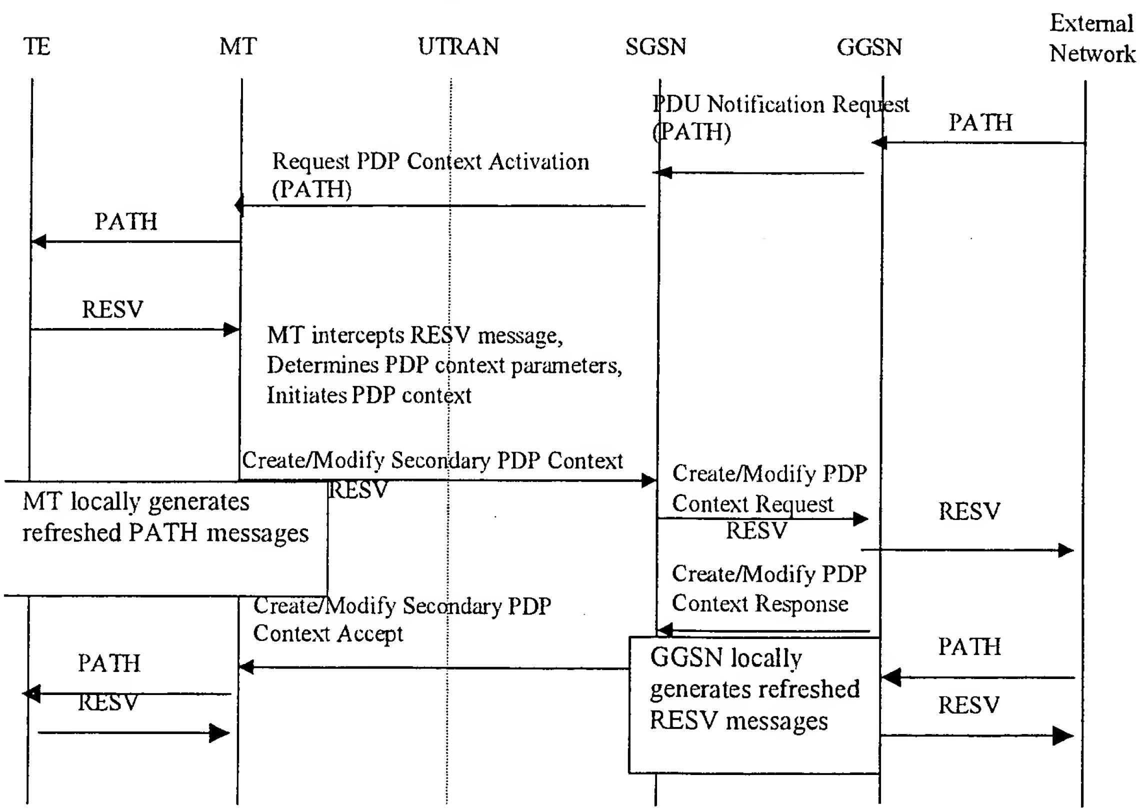

Figure 5: MT and GGSN Terminated RSVP: TE/MT as the RSVP receiver

The case shown in Figure 5 depicts the situation for the QoS control in the downlink direction where no corresponding PDP context exists when the PATH message is received at GGSN. GGSN will send a PDU notification request message to SGSN. SGSN will respond with a PDU notification response and send a request PDP context activation message to the MT. To speed up the negotiation of a PDP context, GGSN piggybacks the PATH message on the PDU Notification Request message and the Request PDP Context Activation message so that the PATH message can be delivered faster to the TE waiting for the PDP context to be set up. It reduces the extra latency of the RSVP QoS negotiation process caused otherwise by sending the RSVP messages separately across the air interface and the UMTS network. The usage of proxies at MT/GGSN to process future PATH/RESV messages helps to minimize extra traffic load across the UMTS network, in particular, over the air interface.

An alternative to piggybacking the RSVP messages in the secondary PDP Context Activation/Modification messages is to carry Tspec/ADSpec objects in the secondary PDP Context Control messages using the PDP Config Option.

When the PATH message or the TrafficSpecs (Tspecs , Adspecs) is received by the MT, it is passed along to the TE. When the TE responds with the RESV message, the MT may make some modifications on the parameters according to the local configuration, then initiate the Activate the secondary PDP Context procedure. The RESV message or the QoS Specs (such as the FlowSpecs) is piggybacked on the message to the GGSN using the PDP config. option. When GGSN receives the Create Secondary PDP Context Request, it extracts the RESV message and relays it to the external network.

For subsequent refresh RSVP messages, proxies can be used at MT and GGSN to locally generate the PATH/RESV messages (shown as the last set of messages in Figure 5). When there is no change in RESV message, MT will not relay it across the airlink. When there is no change in PATH message, GGSN will not relay it across the airlink.

3 PROPOSAL

It is proposed that the general requirements and the two working scenarios to meet the requirements for supporting RSVP in UMTS are included in the QoS section of TR23.821. The suggested texts are as follows:

The General Requirements for Supporting RSVP in UMTS Network

The general requirements for supporting RSVP applications in UMTS network are:

- No change to standard RSVP applications or operating systems.
- No or minimal impact on existing UMTS network architecture, and QoS control procedures.
- Minimize any extra signaling traffic associated with supporting RSVP applications.

- The QoS control in UMTS network does not rely on the RSVP QoS Status, i.e. the soft states.

The Working Scenarios for supporting RSVP in UMTS

Two possible working scenarios are recognized for supporting Applications/MS/UE that uses RSVP to activate QoS control: MT Terminated RSVP Signaling and MT and GGSN Terminated RSVP Signaling.

Scenario I, MT Terminated RSVP signaling, is applicable to an MS/UE using RSVP to communicate with a Non-RSVP application in either an MS or a fxied terminal. The uplink/downlink traffic QoS control using an MT Terminated RSVP signaling is shown in Figure 2 and 3, respectively. It is also applicable for the case where an MS/UE using RSVP to communicate with a RSVP-capable host in external network. For this later case, GGSN is oblivious of all the RSVP messages. This later case will incur more delay in end-to-end QoS negotiation than the approach proposed in Scenario II

Scenario II, MT and GGSN Terminated RSVP signaling, is applicable to the working scenario where the TE intends to set up RSVP session with its remote peer that also uses RSVP signaling across the external network. The uplink/downlink traffic QoS control using an MT Terminated RSVP signaling is shown in Figure 4 and 5, respectively.

To simplify the network control and efficiently utilize the UMTS radio and network resources, it is recommended that RSVP messages are not interpreted by the UTRAN or the SGSN or transmitted separately across the UMTS network, in particular, across the air interface. An approach using the PDP config option within the existing (secondary) PDP Context Control messages may be used to deliver first-time RSVP message related information across the UMTS network. Proxies can be used to locally generate refreshed RSVP messages to minimize extra usage of airlink.

4 REFERENCE

(1) TSGS2#10 S2-000131 "Processing RSVP Signaling in MT".

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(4) J. Border, M. Kojo, Jim Griner, G. Montenegro
"Performance Enhancing Proxies"
IETF <draft-ietf-pilc-pep-01.txt>, Jun 1999

Title : **H.323 Border Elements for Mobile Applications**

Status: **Discussion**

Source: **Lucent Technologies***

Date : **March 6-9th, 2000**

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Milo Orsic
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1. Introduction

Annex G of the H.225.0 Recommendation describes methods to allow address resolution, access authorization and usage reporting between administrative domains in H.323 systems for the purpose of completing calls between the administrative domains. An administrative domain exposes itself to other administrative domains through a type of logical element known as a Border Element. The Border Element is a functional element that supports public access into an administrative domain for the purposes of call completion or any other services that involve multimedia communication with other elements within its administrative domain. The Border Element controls the external view of the administrative domain.

2. Definitions

Wireless Administrative Domains

For wireless applications the Administrative Domains may be defined as follows:

- Home Administrative Domain is the Administrative Domain that is related by subscription to the mobile H.323 network user. The Home Administrative Domain permanently contains user specific data including location, authentication, and service profile information related to the mobile H.323 network user.
- Visited Administrative Domain is the Administrative Domain that is not the Home Administrative Domain and is serving an active mobile H.323 network user.
- Serving (Visited or Home) Administrative Domain is the Administrative Domain that is serving an active mobile H.323 network user.

3. Discussion

Border Elements for Wireless Administrative Domains

The Border Element's call-routing function as defined in the Annex G of the H.225.0 Recommendation can be logically divided into two disjoint functions. The first function pertains to address resolution for the calls that originate in its Administrative Domain. The second function pertains to address resolution for the calls that terminate in its Administrative Domain. For the current landline applications (i.e. excluding number portability) the sets of H.323 terminals that are handled by these two functions are identical.

However, for wireless applications the two Border Element's functions identified above will be logically separated and incorporated into two disjoint logical entities referred to as the Home Border Element and the Serving Border Element (see Figure 1).

Home Border Element

A Home Administrative Domain will expose all its subscribers - irrespective of their current location - to other administrative domains through a new type of logical element referred to as the Home Border Element. A Home Border Element is a functional element that supports public access to mobile H.323 terminals that belong to its Home Administrative Domain - for the purposes of call completion - irrespective of their location. The Home Border Element will

communicate with other Border Elements using the protocol that is specified in Annex G of the H.225.0 Recommendation.

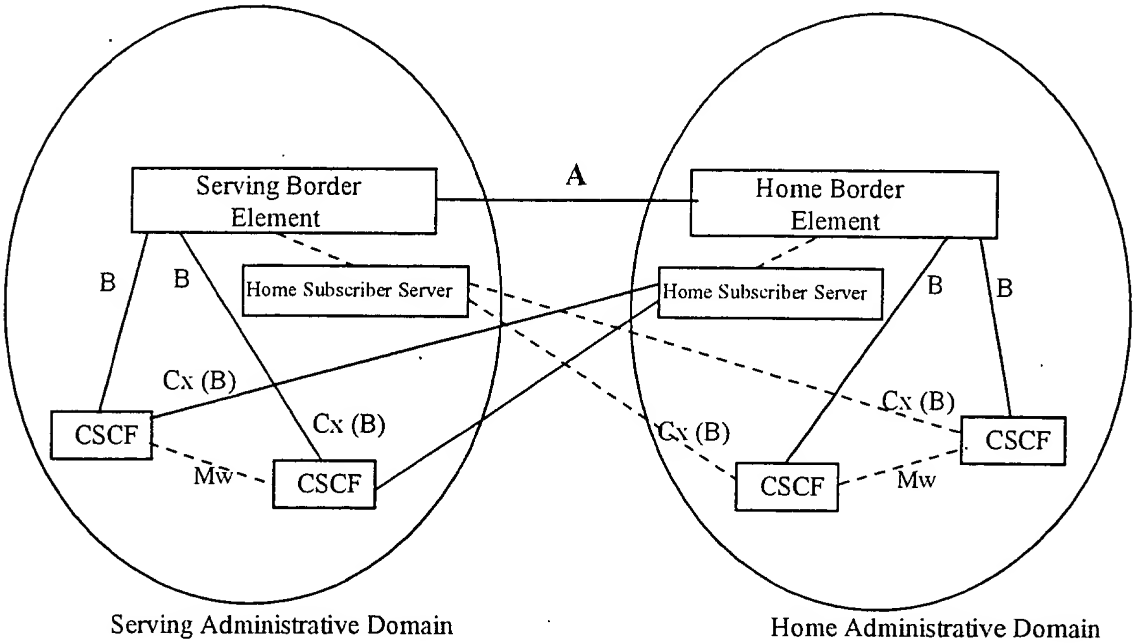

Figure 1

Home Subscriber Server (HSS) Description

To provide services to the roaming wireless mobile 3G terminals, a new 3G functional entity, referred to as the Home Subscriber Server, has been identified. The Home Subscriber Server is a functional entity that is located in the Home Administrative Domain and contains a record for each home subscriber that includes location information, subscriber status, subscribed features, aliases, and directory numbers. In addition, for each roaming mobile H.323 terminal the Home Subscriber Server will also include in the record a list of all Call-Processing entities (i.e.CSCFs and Gateways) in the Serving Administrative Domain that may handle the incoming calls destined for the roaming mobile H.323 terminal. For each listed entity, the following information may be included:

- Identity and the type of the Call processing entity in the serving network that may handle the incoming calls for the visiting mobile H.323 terminal (e.g. H.225 Gatekeeper, SIP-to-H.323 Gateway, and PSTN-to-H.323 Gateway).
- Network Address, the protocol (TCP/UDP), and the port number where the call processing messages should be sent.
- Priority. The priority information specifies the order in which the multiple call-processing functional entities should be tried.

The Serving Administrative Domain (e.g. visited CSCF) will provide this list to the Home Subscriber Server when the roaming wireless mobile H.323 terminal registers with the Serving Administrative Domain (i.e. during the RAS procedure). Upon each re-registration within the current Serving Administrative Domain or with a new Serving Administrative Domain, a new list will be conveyed to the Home Subscriber Server.

Home Border Element Operations

The Home Border Element will maintain two types of address templates. The first type will be advertised to other Border Elements and Clearing Houses. In the advertised address-templates

the Home Border Element will indicate the set of alias addresses (e.g. email-ids and party numbers) that it can resolve. The advertised templates will be marked "*Send Access Request to the Home Border Element*" and will indicate that the "*Call Specific authorization is requested for each call.*" Other Border Elements and Clearing Houses may cache these templates.

With respect to second type of templates, the Home Border Element will maintain an address template for each roaming mobile H.323 terminal that belongs to its Home Administrative Domain. This address template will be dynamically updated upon each mobile H.323 terminal's registration and re-registration with the visited network. Its Home Subscriber Server will convey the update-information to the Home Border Element. This template will also indicated that a Setup message (rather than the Access Request message) should be sent to the indicated contact. When responding to the request to resolve an Alias Address the Home Border Element will explicitly indicate that the supplied information should not be cached. These address templates will not be advertised.

The Home Border Element will communicate with other entities within its Home Administrative Domain (e.g. the Home Subscriber Server) or it may exist in combination with other H.323 elements. In most implementations the Home Border Element will be combined with the Home Subscriber Server.

- ***Serving Border Element***

  A Serving Border Element is a functional element that is located in the Serving Administrative Domain and provides address resolution for the visiting mobile H.323 terminals for the purpose of completing the calls that originated in its Serving Administrative Domain. The Serving Border Element communicates with other Border Elements (including the Home Border Elements) and the Clearing Houses using the protocol specified in Annex G of the H.225.0 Recommendation. In addition, the Serving Border Element may - depending on implementation - communicate with other entities within its Serving Administrative Domain. The Serving Border Element may exist in combination with other H.323 elements (e.g. a combination of Border Element and CSCF).

4. Conclusion

This contribution proposes that the address resolution architecture for Wireless H.323 Administrative Domains described in this contribution be discussed and adopted by the 3GPP WG S2.

Title : Defining the Domains

Status: Discussion

Source: Lucent Technologies*

Date : March 6-9th, 2000

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1. Discussion

The wireless 3G all-IP network will employ a layered IP architecture. For this architecture, the IP plane will extend to all mobile IP terminals. There will be a number of application-level services (e.g. Voice over IP) that will be supported by the underlying IP plane. In the assumed layered architecture, the multimedia H.323 Call-Control service should be viewed as an application-level service that executes in the H.323 Call-Control plane. The H.323 Call-Control plane will extend only to the mobile H.323-capable terminals. This contribution advocates that the H.323 Call-Control plane should be partitioned into Domains. It can be argued that all mobileIP terminals will roam across the IP plane and that their IP-locations in the IP plane will be IP-monitored (e.g. RA, SGSN). However, since the mobile H.323 terminals will also roam in the H.323 Call-Control plane, their location in H.323 Call-Control plane (i.e. their Domain-location) should be monitored as well. The same mechanism (i.e. HSS) that is employed to monitor the location of the mobile IP terminals in the IP plane should be utilized to monitor the location of the mobile H.323 terminals in the H.323 Call-Control plane.

There will be at least one CSCF in each Domain. However, in many cases there will be a number of CSCF-entities in each Domain that will be able to handle the RAS-registration and call-processing functions for the visiting mobile H.323 terminals. All of theseCSCFs will belong to the same multicasting group and share a unique multicast IP address. As the mobile H.323 terminal roams from one visited Domain into another, it should dynamically acquire a new IP address in the next visited Domain and subsequently execute the RAS-registration procedure. Hence, all calls and associated information flows that are destined for the mobile H.323 terminal will be routed directly to the next visited Domain. This will require each SGSN in a visited Domain to have a logical association with a GGSN in a visited Domain that provides the CSCF services. Furthermore, the mobile H.323 terminal - on PDP context setup - would identify the service required as "H.323" services and the SGSN would always choose the default GGSN (geographically closest) in a visited Domain for servicing that mobile H.323 terminal.

If a H.323 call is established when the mobile H.323 terminal is in a given visited Domain, the CSCF-entity initiating the call should be the "anchor" CSCF-entity that will handle the call during its entire duration. In addition, the IP address that was used when establishing the call should be the "anchor" IP address used to route the IP packets to the mobile H.323 terminal during the entire duration of the call. The "anchor" IP address should be utilized irrespective of the mobile H.323 terminal roaming into the next visited Domain during the duration of the H.323 call. The underlying IP handover mechanism (i.e. GPRS) will provide connectivity between the "anchor" IP address and the mobile H.323 terminal's current location during the entire duration of the call. Once the call is cleared, the mobile H.323 terminal will acquire a new IP address and register with a new CSCF-entity whenever it enters a new visited Domain.

The H.323 Call-Control plane will be overlaid on top of the IP plane. Hence, each mobile H.323 terminal that is GPRS attached always will be located in some Domain. As the mobile H.323 terminal roams across the IP plane and executes GPRS Routing Area location-updates, it should be informed whether the Domain boundaries have been crossed. If the Domain boundary has

been crossed, the mobile H.323 terminal will have to acquire a new IP address and register with a CSCF-entity in the new visited Domain. Therefore, a mechanism should be implemented in the 3G all-IP network that will indicate to the mobile H.323 terminal whenever it has crossed the Domain boundaries. This mechanism, for example, may employ the SGSN to inform the mobile H.323 terminal (e.g. in the RA Confirmation message) that it has crossed the Domain boundary. Another alternative may be to incorporate the Domain information into the RAI. When crossing the Domain boundary, the mobile H.323 terminal does not need to know the identity of the new visited Domain. It should be only informed that the Domain boundary has been crossed.

The mobile H.323 terminal's de-registration procedure in the previously visited Domain may be explicitly performed by the mobile H.323 terminal or this task may be executed by the HSS.

2. Registration Scenario

The following steps exemplify the RAS-registration procedure for a roaming mobile H.323 terminal:

1. Upon entering a new visited Domain, the visiting mobile H.323 terminal will acquire an IP address in the visited Domain. The visiting mobile H.323 terminal will maintain this IP address during its stay in the visited Domain.
2. Upon acquiring the IP address, the visiting mobile H.323 terminal will multicast the Gatekeeper Request (GRQ) message over the multicast channel.
3. Multiple CSCFs may respond with the Gatekeeper Confirmation (GCF) message and offer the RAS-registration service to the visiting mobile H.323 terminal. Each CSCF should be able to indicate its "registration priority" (e.g. "traffic load") in the GCF message.
4. The visiting mobile H.323 terminal will initiate the RAS-registration procedure by sending the Registration Request (RRQ) message to the selected CSCF.
5. The selected CSCF will inform the visiting mobile H.323 terminal's HSS about its location (it will convey to the HSS the IP address of the visiting mobile H.323 terminal). In addition, the selected CSCF will also offer its call processing service for the visiting mobile H.323 terminal by sending to the HSS the IP address where the call processing messages (destined for the visiting mobile H.323 terminal) should be sent.
6. The HSS may accept the offer or select a different CSCF (e.g. a CSCF in the home Domain). If a different CSCF has been selected, the HSS will return to the CSCF (in the visited Domain) the IP address of the CSCF (e.g. in the home Domain) that should handle the call processing for the mobile H.323 terminal.
7. The IP address of the CSCF that the visiting mobile H.323 terminal should use when initiating a call is sent to the mobile H.323 terminal in the Registration Confirmation (RCF) message.

3. Conclusion

This contribution discusses the need for partitioning the Call-Control plane into Domains. It also specifies that whenever the mobile H.323 terminal enters a new Domain it should acquire an IP address and RAS-register with a CSCF-entity in the respective Domain. In addition, this contribution identifies the need for a mechanism to inform the roaming mobile H.323 terminal whenever it crosses the Domain boundaries. It is recommended that the material presented in this contribution be discussed and adopted by the 3GPP WG S2.

3GPP TSG SA2 Meeting #12
Tokyo, Japan, 6-9 March 2000

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Proposed change affects: (U)SIM [ ] ME [ ] UTRAN / Radio [X] Core Network [X]
(at least one should be marked with an X)

Source: Lucent Technologies **Date:** 2000-03-02

Subject: Clarifications on Iu interface

Work item: Release 99

Category:				**Release:**	
	F	Correction		Phase 2	
	A	Corresponds to a correction in an earlier release		Release 96	
(only one category	B	Addition of feature		Release 97	
shall be marked	C	Functional modification of feature		Release 98	
with an X)	D	Editorial modification	X	Release 99	X
				Release 00	

Reason for change: This CR proposes text to clarify, as per the RAN3 decision to include the possibility of IP routers within the Iu interface.

Clauses affected: 5.4.1

Other specs affected:			
	Other 3G core specifications		→ List of CRs:
	Other GSM core specifications		→ List of CRs:
	MS test specifications		→ List of CRs:
	BSS test specifications		→ List of CRs:
	O&M specifications		→ List of CRs:

Other comments: . The relevant RAN3 CR (R300855) is attached FYI.

help.doc

<--------- double-click here for help and instructions on how to create a CR.

5.4.1 Packet Domain Core Network Nodes

A GPRS Support Node (GSN) contains functionality required to support GPRS and/or to support UMTS packet domain functionality. In one PLMN, there may be more than one GSN.

The Gateway GPRS Support Node (GGSN) is the node that is accessed by the packet data network due to evaluation of the PDP address. It contains routeing information for attached GPRS users. The routeing information is used to tunnel N-PDUs to the MS's current point of attachment, i.e., the Serving GPRS Support Node. The GGSN may request location information from the HLR via the optional Gc interface. The GGSN is the first point of PDN interconnection with a GSM PLMN supporting GPRS (i.e., the Gi reference point is supported by the GGSN). GGSN functionality is common for GPRS and for the UMTS packet domain.

The Serving GPRS Support Node (SGSN) is the node that is serving the MS. The SGSN supports GPRS (i.e., the Gb interface is supported by the SGSN) and/or UMTS (i.e., the Iu interface is supported by the SGSN). At GPRS attach, the SGSN establishes a mobility management context containing information pertaining to e.g., mobility and security for the MS. At PDP Context Activation, the SGSN establishes a PDP context, to be used for routeing purposes, with the GGSN that the subscriber will be using.

The SGSN and GGSN functionalities may be combined in the same physical node, or they may reside in different physical nodes. SGSN and GGSN contain IP or other (operator's selection, e.g., ATM-SVC) routeing functionality, and they may be interconnected with IP routers. In UMTS, the SGSN and RNC may be interconnected with one or more IP routers. When SGSN and GGSN are in different PLMNs, they are interconnected via the Gp interface. The Gp interface provides the functionality of the Gn interface, plus security functionality required for inter-PLMN communication. The security functionality is based on mutual agreements between operators.

The SGSN may send location information to the MSC/VLR via the optional Gs interface. The SGSN may receive paging requests from the MSC/VLR via the Gs interface.

The SGSN interfaces with the GSM-SCF for optional CAMEL cost control. Depending on the result from the CAMEL interaction, the session and packet data transfer may proceed normally. This also applies if the SGSN does not support CAMEL interaction. Otherwise, interaction with the GSM-SCF continues as described in 3G TS 23.078 [8b]. Only the GSM-SCF interworking points are indicated in the signalling procedures in this specification.

CHANGE REQUEST

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25.414 CR 011 Current Version: 3.2.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to: RAN#7 *list expected approval meeting # here ↑*	for approval [X] for information [ ]	strategic [ ] non-strategic [ ]	*(for SMG use only)*

Form: CR cover sheet, version 2 for 3GPP and SMG The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: (U)SIM [ ] ME [ ] UTRAN / Radio [X] Core Network [X]
(at least one should be marked with an X)

Source: Ericsson, Lucent **Date:** 25.2.2000

Subject: Need for IP routing capabilities in the SGSN

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	X
A	Corresponds to a correction in an earlier release	
B	Addition of feature	
C	Functional modification of feature	
D	Editorial modification	

Release:

Phase 2	
Release 96	
Release 97	
Release 98	
Release 99	X
Release 00	

Reason for change:

According to TS 23.121 v 3.2.0 [3], the SGSN acts as a router for IP packet forwarding during the Relocation procedure when the source RNC receives the IP address of the target RNC in the 'Relocation Command' message. The source RNC and the target RNC are not in the same LIS (Logical IP Subnet), so a routing function is required to deliver the data.

According to TS 25.414 [2] Classical IP over ATM is required at the Iu interface when PVCs are used. Classical IP over ATM (RFC 2225) [1] allows a router to be a member in a LIS, therefore routers are allowed also at the Iu interface.

The following is stated in RFC 2225:

RFC 2225, Ch. 5.2:

> *The requirements for IP members (hosts, routers) operating in an ATM LIS configuration are:...*

RFC 2225, Ch. 4:

> *"One IP subnet is used for many hosts and routers. Each VC directly connects two IP members within the same LIS."*

RFC 2225, Ch. 5.1:

> *"Communication to hosts located outside of the local LIS is provided via an IP router. This router is an ATM endpoint attached to the ATM network that is configured as a member of one or more LISs."*

Clauses affected: 3.3, 6.1.5

Other specs affected:	Other 3G core specifications		→ List of CRs:
	Other GSM core specifications		→ List of CRs:
	MS test specifications		→ List of CRs:
	BSS test specifications		→ List of CRs:
	O&M specifications		→ List of CRs:

Other comments:

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3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AAL	ATM Adaptation Layer
AESA	ATM End System Address
ALCAP	Access Link Control Application Part
ARP	Address Resolution Protocol
ATM	Asynchronous Transfer Mode
RFC	Request For Comment
CN	Core Network
GTP	GPRS Tunnelling Protocol
IP	Internet Protocol
LIS	Logical IP Subnet
MTP3b	Message Transfer Part level 3 for Q.2140
NSAP	Network Service Access Point
PDU	Protocol Data Unit
RNC	Radio Network Controller
SAR	Segmentation and Reassembly
SCCF-NNI	Service Specific Coordination Function-Network Node Interface
SSCOP	Service Specific Connection Oriented Protocol
SSCS	Service Specific Convergence Sublayer
UDP	User Datagram Protocol
VC	Virtual Circuit

6.1.5 IP/ATM

Classical IP over ATM protocols are used to carry the IP packets over the ATM transport network when PVCs are used. Classical IP over ATM is specified in IETF RFC 2225 [15]. Multiprotocol Encapsulation over AAL5 is specified in IETF RFC 1483 [14].

Classical IP over ATM allows routers to be members of one or more LISs. The CN side of the Iu interface shall provide IP routing functionalities. The RNC side of the Iu interface may provide routing functionalities. If the RNC side of the Iu interface does not provide routing functionalities, the RNC routing tables shall include default route entries.

3GPP TSG SA2 Meeting #12
Tokyo Japan, 6th-9th March 2000

Document S2-000485
e.g. for 3GPP use the format TP-99xxx or for SMG, use the format P-99-xxx

CHANGE REQUEST

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23.121 CR 57 Current Version: 3.2.1

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to: TSG#7	for approval [X]	strategic [ ]	(for SMG use only)
list expected approval meeting # here ↑	for information [ ]	non-strategic [ ]	

Form: CR cover sheet, version 2 for 3GPP and SMG The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]
(at least one should be marked with an X)

Source: Lucent Technologies **Date:** 25 Jan., 2000

Subject: Removal of FFS items in 23.121

Work item:

Category:				**Release:**		
	F	Correction	[ ]		Phase 2	[ ]
	A	Corresponds to a correction in an earlier release	[ ]		Release 96	[ ]
(only one category	B	Addition of feature	[ ]		Release 97	[ ]
shall be marked	C	Functional modification of feature	[ ]		Release 98	[ ]
with an X)	D	Editorial modification	[X]		Release 99	[X]
					Release 00	[ ]

Reason for change: In section 4.3.1.1 the ffs item has been resolved within N1 and S2, see 23.060.

Section 4.3.2.1.5, the nature of the timers referred to in this section have now been defined between RAN and S2.

Section 4.3.14.1.1 and 4.3.14.1.2 are changed as agreed by RAN3/S2, see for example 23.060.

Section 4.3.14.1.5, behaviour is as defined.

Section 4.3.14.4 deleted.

- Detailed procedures for 2G to 3G handover are covered in 23.060.
- The logical/physical characteristics are specified within the RAN Iu set of documents. (25.410-25.415)
- Combined MAP procedures are not in R99

Section 6,

- a reference has been added to the S1 document on GSM-UMTS Interoperability.
- The case outlined in the last sentence is covered by the selective RAU procedure in 23.060.

Clauses affected: 4.3.1.1, 4.3.2.1.5, 4.3.14.1.1, 4.3.14.1.2, 4.3.14.1.5, 4.3.14.4, 6

Other specs affected:	Other 3G core specifications		→ List of CRs:
	Other GSM core specifications		→ List of CRs:
	MS test specifications		→ List of CRs:
	BSS test specifications		→ List of CRs:
	O&M specifications		→ List of CRs:

Other comments:

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<--------- double-click here for help and instructions on how to create a CR.

In RRC Idle mode it is the broadcasted MM system information (e.g. information about the present Location Area and present Routing Area) that determines when the UE initiates a location registration procedure towards the CN. An UE in state CS-IDLE will in RRC Idle mode, initiate Location Area update towards the CN when crossing LA border. An UE in state PS-IDLE will in RRC Idle mode initiate Routing Area update towards the CN when crossing RA border.

In RRC Connected mode, the UE receives the MM system information on the established RRC connection. (I.e. the broadcasted MM system information is not used by the UE in the RRC connected mode.) An UE in state CS-IDLE will, in RRC Connected mode, initiate Location Area update towards the CN when receiving information indicating a new Location Area. An UE in state PS-IDLE will, in RRC Connected mode, initiate Routing Area update towards the CN when receiving information indicating a new Routing Area. An UE in state CS-CONNECTED will, in RRC Connected mode, not initiate Location Area update towards the CN. An UE in state PS- CONNECTED will, in RRC Connected mode, not initiate Routing Area update towards the CN.

In CS-DETACHED mode the UE will not initiate any Location Area update and this independent of the RRC mode. In PS-DETACHED mode the UE will not initiate any Routing Area update and this independent of the RRC mode.

In additional to normal location registration when changing registration area, the UE may (network options) perform CS periodic registration when in CS-IDLE state and PS periodic registration when in PS-IDLE state. The respective periodic registration may be on/off on Location Area respective Routing Area level.

On the Mobility Management level, IMSI and CS related TMSI are used as UE identities in the CS service domain, and IMSI and PS related TMSI are used as UE identities in the PS service domain. The IMSI is the common UE identity for the two CN service domains.

A signalling connection between the UE and the CN refers to a logical connection consisting of an RRC connection between UE and UTRAN and an Iu signalling connection ("one RANAP instance") between the UTRAN and the CN node. The CS service domain related signalling and PS service domain related signalling uses one common RRC connection and two Iu signalling connections ("two RANAP instances"), i.e. one Iu signalling connection for the CS service domain and one Iu signalling connection for the PS service domain.

4.3.1.1 Use of combined procedures for UMTS

The use of separated PS and CS mobility mechanisms within the UE and within the CN may lead to non-optimal usage of the radio resource (for example a UE in PS idle and CS idle state would perform both location updates (for the CS mechanism) and Routing area updates (for PS mechanisms)).

UMTS should optimise the use of radio resources., The use of combined updates (similar to the current GSM/GPRS Gs combined update mechanism) may enable this. To offer flexibility in the provision of mobility management for UMTS, it should be possible to use combined mechanisms for location management purposes as well as for attach/detach status purposes.

From the UE perspective it should be possible for the UE to perform combined update mechanisms (operator option). UMTS Phase 1 R99 terminals should support the use of both combined and separate mechanisms. The support of this feature by all UMTS mobiles will also ease evolution of UMTS MM in the future.

In the UMTS specifications the RAN will not co-ordinate mobility management procedures that are logically between the core network and the MS. This includes: location management, authentication, temporary identity management and equipment identity check.

~~The issues of security, temporary identifiers, CS and PS periodic registrations and PS-DETACHED/CS DETACHED need to be studied.~~

4.3.2 Description of the Location Management and Mobility Management Concept

4.3.2.1 Area concepts

For the mobility functionality four different area concepts are used. Location Area and Routing Area in the CN as well as UTRAN Registration Area and Cell areas in the UTRAN.

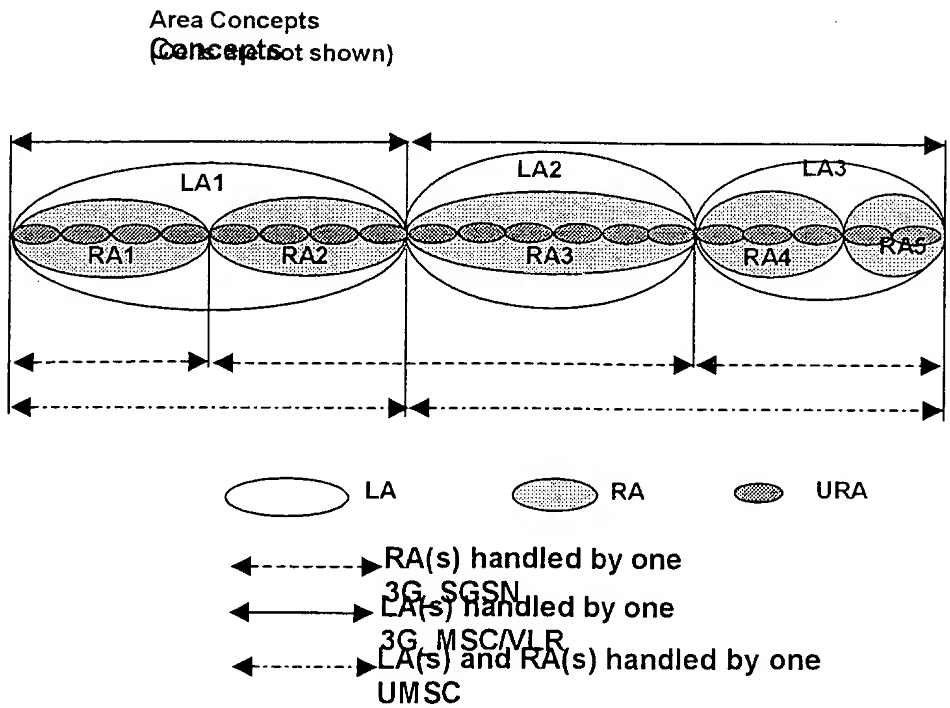

Figure 4-10: Relationship between different areas.

4.3.2.1.5 Hierarchical tracking concept

A packet UE (in RRC connected mode) is tracked at the cell level by RNC during an active connection.

A packet UE (in RRC connected mode) is tracked at the URA level by RNC when no data are actively transfer, and the probability of data transfer is quite high.

A packet UE (in PS-Idle state) is tracked at the Routing Area level by SGSN when no data is actively transfered and the probability of data transfer is quite low.The network operator should be able to optimise paging and updating load by controling the size of the different areas and the probability of data transfer (controlled by the RRC_connection_release timer). For example, one operator may decide that URA are small, and that RRC connection are released after a relatively short time of inactivity, so that most attached packet UE are tracked in the Routing Area level (optimum for packet UE mainly using client-server type of service).

Another operator may decide that URA are large, and that RRC connection are released only if RRC connection is lost, so that most attached packet UE are tracked at the URA level.

~~Different timer values are required for the URA Update Timer and for the RRC Connection Release Timer. It is for further study whether the duration of the RRC_Connection_Release timer is set on a per UE basis, or configurable by the operator to be the same for all UE.~~

4.3.3 Relationship between MM and SM states for an UE

When a UE is attached to PS service, it may have or not some PDP context established.

If the UE has no PDP context established (SM-Inactive), no radio access bearer are established for PS service. The UE is in RRC connected mode, only if the state is UMTS CS-CONNECTED state or UMTS PS-CONNECTED state (i.e. only a PS signaling connection is established).

If the UE has at least one PDP context established (SM-Active), the UE may be in UMTS PS-CONNECTED state or in UMTS PS-IDLE state.

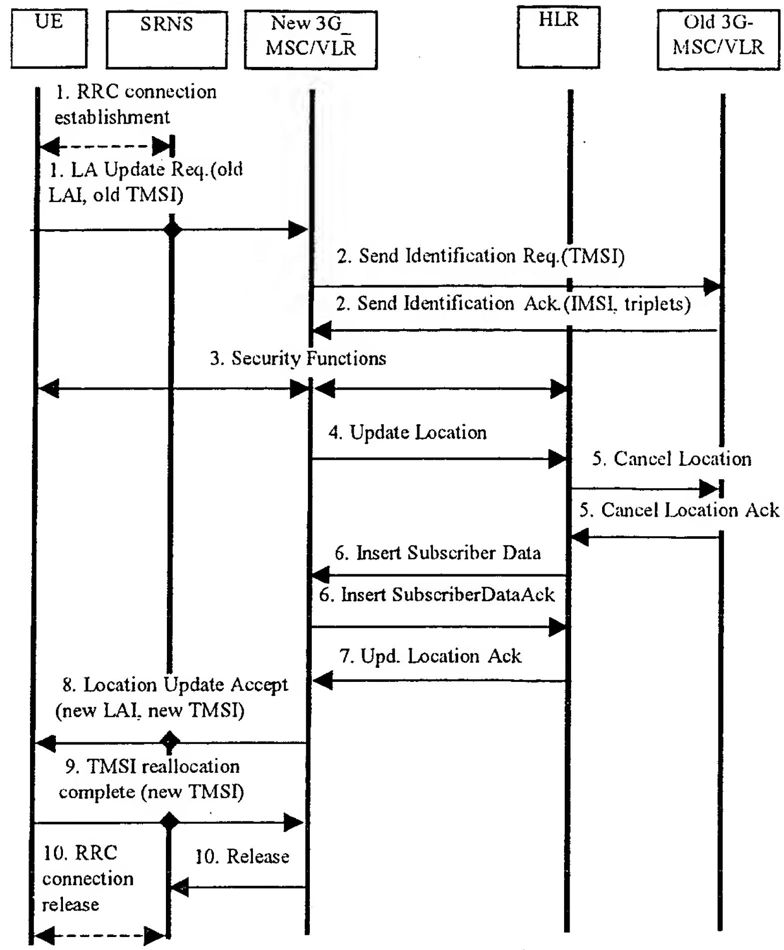

Figure 4-17: Interface information transfer for location update when changing VLR area

- The RRC connection is established, if not already done. The UE sends the initial message Location Area Update Request (old TMSI, old LAI, etc.) to the new 3G_MSC/VLR. The old TMSI and the old LAI are assigned data in UMTS. The SRNS transfers the message to the 3G_MSC/VLR. The sending of this message to 3G_MSC/VLR will also imply establishment of a signalling connection between SRNS and 3G_MSC/VLR for the concerned UE. ~~The 3G_MSC/VLR determines the new Location Area for the UE. Whether the 3G_MSC/VLR derives the new LAI from information supplied by the UE or by the SRNS is ffs.~~ The UTRAN shall add the RAC and the LAC of the cell where the message was received before passing the message to the MSC.

- The new 3G_MSC/VLR sends an Send Identification Request (old TMSI) to the old 3G_MSC/VLR to get the IMSI for the UE. (The old LAI received from UE is used to derive the old 3G_MSC/VLR identity/address.) The old 3G_MSC/VLR responds with Send Identification Ack. (IMSI and Authentication triplets).

- Security functions may be executed.

- The new 3G_MSC/VLR inform the HLR of the change of 3G_MSC/VLR by sending Update Location (IMSI, MSC address, VLR number) to the HLR.

- The HLR cancels the context in the old 3G_MSC/VLR by sending Cancel Location (IMSI). The old 3G_MSC/VLR removes the context and acknowledges with Cancel Location Ack .

- The HLR sends Insert Subscriber Data (IMSI, subscription data) to the new 3G_MSC/VLR. The new 3G_MSC/VLR acknowledges with Insert Subscriber Data Ack.

- The HLR acknowledges the Update Location by sending Update Location Ack. to the new 3G_MSC/VLR.

- The RRC connection is established, if not already done. The UE sends the initial message Routing Area Update Request (old P-TMSI, old RAI, etc.) to the new 3G_SGSN. The old P-TMSI and the old RAI are assigned data in UMTS. The SRNS transfers the message to the 3G_SGSN. The sending of this message to 3G_SGSN will also imply establishment of a signalling connection between SRNS and 3G_SGSN for the concerned UE. The UTRAN shall add the RAC and the LAC of the cell where the message was received before passing the message to the SGSN.

~~The 3G_SGSN determines the new Routing Area for the UE. Whether the 3G_SGSN derives the new RAI from information supplied by the UE or by the SRNS is ffs.~~

- The new 3G_SGSN send an SGSN Context Request (old P-TMSI, old RAI) to the old 3G_SGSN to get the IMSI for the UE. (The old RAI received from UE is used to derive the old 3G_SGSN identity/address.) The old 3G_SGSN responds with SGSN Context Response (e.g. IMSI, PDP context information and Authentication triplets).
- Security functions may be executed.
- The new 3G_SGSN informs the HLR of the change of 3G_SGSN by sending Update GPRS Location (IMSI, SGSN number, SGSN address) to the HLR.
- The HLR cancels the context in the old 3G_SGSN by sending Cancel Location (IMSI). The old 3G_SGSN removes the context and acknowledges with Cancel Location Ack.
- The HLR sends Insert Subscriber Data (IMSI, subscription data) to the new 3G_SGSN. The new 3G_SGSN acknowledges with Insert Subscriber Data Ack.
- The HLR acknowledges the Update GPRS Location by sending Update GPRS Location Ack. to the new 3G_SGSN.
- The new 3G_SGSN validate the UEs presence in the new RA. If due to regional, national or international restrictions the UE is not allowed to attach in the RA or subscription checking fails, then the new 3G_SGSN rejects the Routing Area Update Request with an appropriate cause. If all checks are successful, then the new 3G_SGSN responds to the UE with Routing Area Update Accept (new P-TMSI, new RAI, etc.).
- The UE acknowledges the new P-TMSI with Routing Area Update Complete.
- When the location registration procedure is finished, the 3G_SGSN may release the signalling connection towards the SRNS for the concerned UE. The SRNS will then release the RRC connection if there is no signalling connection between 3G_MSC/VLR and SRNS for the UE.

4.3.14.1.3 Periodic Registration towards both CN nodes without use of Gs

This example shows Periodic Registration to both the 3G_MSC/VLR and the 3G-SGSN (i.e. no change of registration areas) when the UE is in MM idle state and registered in both the 3G_SGSN and the 3G_MSC/VLR.

The illustrated transfer of MM signalling to/from the UE uses an established RRC connection. This RRC connection will be established, is in this case, only for the two registration procedures towards the 3G_SGSN and 3G_MSC/VLR.

For each indicated MM message sent to/from UE, the CN discriminator indicates either 3G_ SGSN or 3G_MSC/VLR.

4.3.14.1.4 Periodic Registration with use of Gs/UMSC

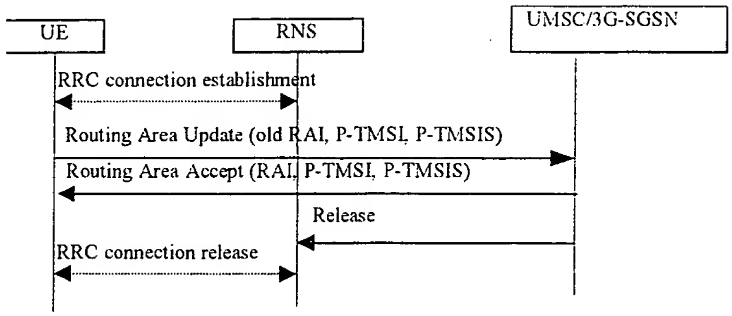

Figure 4-20: Periodic update procedure when the MS is attached for both CS and PS services

An RRC connection is established for the periodic registration. Note that this procedure is invoked only when the UE is in MM-idle state. The UE sends a Routing Area Update to the UMSC. The UMSC authenticates the P-TMSI signature. If the update is successful it sends a Routing Area Accept message. The RRC connection is then released.

4.3.14.1.5 UE initiated Combined Detach Procedure when using Gs/UMSC

The UE-Initiated Detach procedure when initiated by the UE is illustrated in Figure 4-21. Each step is explained in the following list.

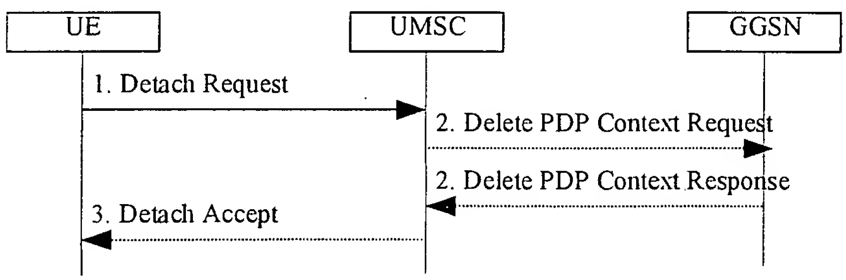

Figure 4-21: UE-Initiated Combined Detach Procedure (The procedure for combined detach when using Gs is as defined in GSM 03.60)

- 1) The UE detaches by sending Detach Request (Detach Type, Switch Off) to the UMSC. Detach Type indicates which type of detach that is to be performed, i.e., PS Detach only, CS Detach only or combined Detach. Switch Off indicates whether the detach is due to a switch off situation or not.
- If PS detach, any active PDP contexts in the GGSNs regarding this particular UE may be deactivated. ~~This is FFS~~
- If Switch Off indicates that the detach is not due to a switch off situation, the UMSC sends a Detach Accept to the UE.

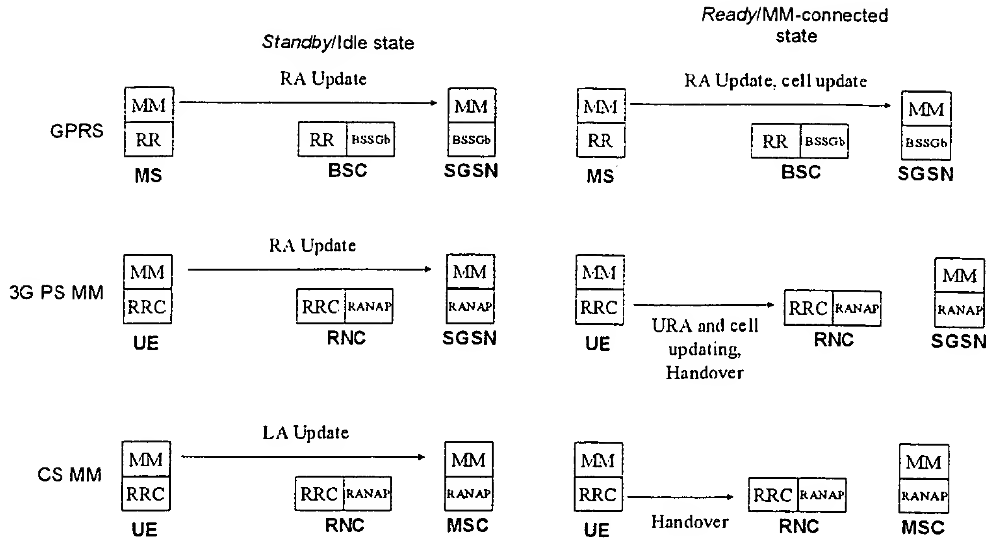

Figure 4-31 The states written in italics correspond to those defined in GSM with GPRS.

4.3.14.3.1 PS -idle state

The RA update procedure is utilised to update the whereabouts of the UE into SGSN. The updating into SGSN takes place irrespectively of the CS MM state in MSC.

4.3.14.3.2 PS -connected state

The URA and cell updating and handover procedures presented in Figure 4-31 are based on UMTS YY.03 [2]. In brief, the aim in [2] is to introduce functionality that caters for the same functionality as standby/ready in GPRS. The RRC shall be designed in such a fashion, which allows the state of the RRC connection to define the level of activity associated to a packet data connection. The key parameters of each state are the required activity and resources within the state and the required signalling prior to the packet transmission. The operator configurable RRC_connection_release timer can be used to release RRC connections in case of very low level of activity and in case the QoS requirements e.g. delay requirement allow the release of the RRC connection.

The cell update and URA update between UE and RNC are used when the UE is in RRC common channel state, i.e., when the above mentioned parameters allow to scale down the resources reserved for the UE (for a more detailed description on this, see [2]). For example, the purpose of the cell update procedure is to allow the UE to inform its current location in the corresponding RRC state. According to [2] the cell update procedure replaces handover in the corresponding RRC substate.

A significant deviation from GPRS is the introduction of the handover procedures for connections supporting traffic into IP domain (in RRC cell connected state, see [2]).

The UE moves to PS-IDLE state in case of expiry of RRC_connection_release timer or an RRC connection failure.

~~4.3.14.4 Issues for further study~~

~~List of issues that are for further study related to this chapter and is the following:~~

~~More details are required with regards to the differences with regards to the "IP-domain" MM compared to GPRS MM, especially considering roaming and handover to/from UMTS to GSM/GPRS.~~

~~More details should be provided with regards to the logical relations between UE-CN and UTRAN-CN, and how these relate to the physical interconnection between UTRAN and the CN nodes(s), namely whether one logical/physical Iu can be used to interconnect the UTRAN with the CN.~~

~~It should be clarified whether this approach allows for the possibility to use a common signalling connection from MSC and/or SGSN to the HLR.~~

4.3.15 Combined update towards the HLR for a combined 3G-(MSC/VLR+SGSN) configuration

Note: Combined location update procedures are not a high priority architectural requirement for UMTS R99.

4.3.15.1 Motivation

In order to optimise the signalling load within the network, reduce operating and maintenance costs and creating the possibility to combine cs and ps handover it is essential to open the door in the specifications for combined 3G-(MSC/VLR+SGSN) solutions.

4.3.15.2 Technical description

For the area concept discussed for the time being, four different cases have to be distinguished:

- change of UTRAN Registration Area (URA) within the same Routing Area (RA)
- change of URA and RA within the same Location Area (LA)
- change of URA, RA, or LA within the same node
- change of URA, RA, or LA, and node

For a combined 3G-(MSC/VLR+SGSN) node only in case 4 the UE's HLR has to be updated. If the UE is idle mode for the packet and circuit switched traffic a combined 3G-(MSC/VLR+SGSN) node will run the location update procedure jointly for the UE's CS and PS domain resulting in one combined location update message, see Figure 4-32.

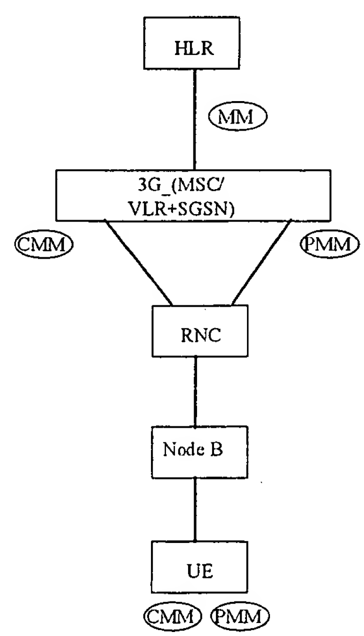

Figure 4-32 Combined MM Instance For a Combined 3G-(MSC/VLR+SGSN) Node

Split nodes may have to run one specific location update procedure for any of the two domains resulting in two separate location update messages, see Figure 4-33.

a) Networks which provide the functionality of CS Service Domain and PS Service Domain.

b) Networks which only provide the functionality of the CS Service Domain.

c) Networks which only provide the functionality of the PS Service Domain.

The following terminal configurations shall be allowed:

a) Terminals which are able to access both to the CS Domain and PS Domain.

b) Terminals which are only able to access to the PS Domain.

c) Terminals which are only able to access to the CS Domain.

It shall be noted that e.g. terminal which is only able to access to the PS Domain supports only mobility management, protocols etc. of that particular domain. The different configurations given above shall not prevent CS-type services from being delivered over the PS domain.

5 UMTS to UMTS handover for circuit switched services

For UMTS to UMTS Inter-MSC Handover the GSM E i/f transporting BSSAP messages with necessary modifications for GSM to UMTS Handover shall be used.

[Ed note: signaling flows are to be provided and be in line with "GSM to UMTS handover for circuit switched services"]

6 Interoperability between GSM and UMTS

The requirements for GSM - UMTS interoperability is defined in 22.129.

~~Transparency [from a users perspective] of roaming and handover~~

~~Re-use of existing subscription profiles~~

~~Note: This list is not exhaustive and is FFS.~~

~~This allows easier management and deployment of a new UMTS network~~.

UMTS is a system supporting handovers between GSM and UMTS in both directions. To support these handovers effectively, the following is required from a dual mode MS/UE supporting simultaneous ISDN/PSTN and packet service in GSM/UMTS:

Depending upon the solution adopted for GSM-UMTS handover, the MS/UE supporting simultaneous ISDN/PSTN and packet service may be required to perform appropriate update into CN depending on the activity of the UE once the handover between GSM and UMTS is completed. This update is needed to avoid any severe interruptions on the accessibility of packet services after the handover.

The nature of the update to be made after the handover in both direction, i.e., from GSM to UMTS and from UMTS to GSM, from MS/UE depends on the activity of the UE in the following way:

ISDN/PSTN connection: RA update only (if RA is changed)

Packet connection: LA and RA update (if RA and LA are changed)

Both ISDN/PSTN and packet connection: RA update only (if RA is changed)

~~If the RA, LA or both LA and RA are not changed the MS/UE behaviour is for further study~~

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GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to: TSG#7	for approval [X]	strategic [ ]	*(for SMG use only)*
list expected approval meeting # here ↑	for information [ ]	non-strategic [ ]	

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from:* ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]
(at least one should be marked with an X)

Source: Lucent Technologies **Date:** 25 Jan., 2000

Subject: Replacement of the term L3CE

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	[ ]
A	Corresponds to a correction in an earlier release	[ ]
B	Addition of feature	[ ]
C	Functional modification of feature	[ ]
D	Editorial modification	[X]

Release:

Phase 2	[ ]
Release 96	[ ]
Release 97	[ ]
Release 98	[ ]
Release 99	[X]
Release 00	[ ]

Reason for change: L3CE has been replaced by PDCP. Figure 4.43 does not exist and is not referenced, so it is proposed to delete the figure caption.

Clauses affected: 4.8.1

Other specs affected:

Other 3G core specifications	[ ]	→ List of CRs:
Other GSM core specifications	[ ]	→ List of CRs:
MS test specifications	[ ]	→ List of CRs:
BSS test specifications	[ ]	→ List of CRs:
O&M specifications	[ ]	→ List of CRs:

Other comments:

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4.8 Location of the IP compression function in UMTS

4.8.1 Functional role of SNDCP / PDCP~~L3CE~~

Out of the functions devoted to SNDCP in 2G network, only header compression and XID negotiation functions need to be considered in UMTS. Hence the term ~~L3CE~~ Packet Data Convergence Protocol (PDCP) is introduced.

~~Figure 4-43bis: Compression Entity Functionality for UMTS~~

4.8.2 Position for header compression

RNC position for header compression is the best place because:

differential header compression algorithms work better if they are located in the place where packets are more likely to be discarded (after having discarded packets the compression algorithm can send a packet with full header[1]). This place is the RNC (where the queues for downstream packets waiting for radio resources are located).

The compression entity is as close as possible to the reliable link (as in 2G) which in this case is the RLC. Therefore it can be stated that a faster recovery of packets is possible after loss of packets in the radio interface and this solution will therefore minimize the amount of buffering in the UE and network.

the compression can be optimized for the used RAN.

It increases the possible data rates that can be achieved: Locating the compression function in the RAN defers the SGSN from the task of opening and processing packets

efficient inter-system hand-over can be supported

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For submission to: TSG#7 for approval [X] strategic [ ] *(for SMG*
list expected approval meeting # here ↑ for information [ ] non-strategic [ ] *use only)*

Form: CR cover sheet, version 2 for 3GPP and SMG The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: (U)SIM [ ] ME [ ] UTRAN / Radio [X] Core Network [X]
(at least one should be marked with an X)

Source: Lucent Technologies **Date:** 25 Jan., 2000

Subject: Deletion of the handover descriptions that are covered in 23.009 and 23.060.

Work item:

Category:				**Release:**		
	F	Correction	[ ]		Phase 2	[ ]
	A	Corresponds to a correction in an earlier release	[ ]		Release 96	[ ]
(only one category	B	Addition of feature	[ ]		Release 97	[ ]
shall be marked	C	Functional modification of feature	[ ]		Release 98	[ ]
with an X)	D	Editorial modification	X		Release 99	X
					Release 00	[ ]

Reason for change: The text describing handover of circuit switched services between GSM and UMTS in sections 6.1.1 and 6.1.2 is also within 23.009. It is proposed to delete the description from 23.121.

The text describing handover between GSM GPRS and UMTS in sections 6.2.2.1 and 6.2.2.2 is also within 23.060. It is proposed to delete the description from 23.121.

Clauses affected: 6.1.1, 6.1.2, 6.2.2.1 and 6.2.2.2

Other specs affected:			
	Other 3G core specifications	[ ]	→ List of CRs:
	Other GSM core specifications	[ ]	→ List of CRs:
	MS test specifications	[ ]	→ List of CRs:
	BSS test specifications	[ ]	→ List of CRs:
	O&M specifications	[ ]	→ List of CRs:

Other comments:

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<--------- double-click here for help and instructions on how to create a CR.

6.1 Circuit Switched Handover and Roaming Principles

Introduction of a UMTS Core Network necessitates the inter-connection with legacy systems to allow inter-PLMN roaming and handover.

For ease of convergence with the existing networks and the introduction of dual mode handsets, roaming andhandover to/from UMTS should be performed in the simplest manner that requires as little change as possible to the legacy networks and standards, i.e. inter-MSC handover functionality.

These principles provide – from a user perspective – transparency ofhandover and roaming. In addition, operators providing UMTS services should also allow access to legacy networks using existing subscriber profiles and network interfaces.

Illustrated in Figure 6-1 shows the introduction of a UMTS Core Network for UMTS phase 1 network configuration. Notice that it leaves the current GSM specifications mainly untouched whereupon the UMTS core network acts towards the GSM MSC like a GSM MSC by providing for example MAP/E for handover purposes. Further, it should be observed that GSM subscriptions belong to the HLR whilst UMTS subscriptions exist in the HLR release 99..

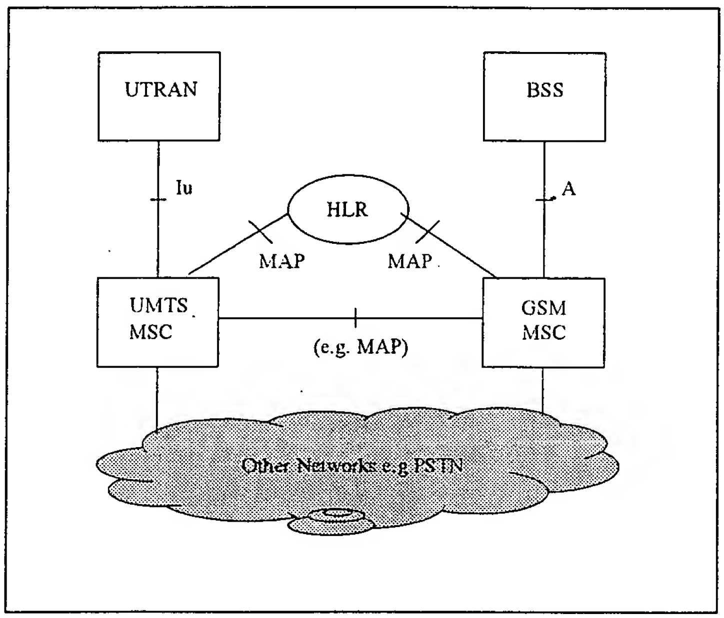


Figure 6-1 Inter-Operability between GSM and UMTS

Note: No physical implementation should be taken from the figure. As a further note, nointerworking functions are shown to ease clarity, but however should not be precluded.

From Figure 6-1 it can be seen that the information exchanged over theIu must provide the necessary parameters to enable the core networks to communicate via for example the MAP interface for handover purposes.

Also note that from the above diagram, existing interfaces are used towards the HLR to allow for subscription management based on today's principles using the already defined user profile, providing seamless roaming between the 2nd generation system and UMTS.

The existing GSM handover procedures should be re-used to minimise the effects on existing GSM equipment.

- The anchor concept in GSM for inter-MSC handover should be used for inter-system handover between UMTS and GSM.

- The signalling over the A-interface and over the MAP/E-interface should be the same as in GSM phase 2+ with possibly addition of some new or updated information elements in some messages.

- For the set up of the handover leg (user plane) standard ISUP/POTS should be used in line with the principles used in GSM.

- The control signalling over the Iu-interface at handover between UMTS and GSM should be based on the A-interface signalling at inter-MSC handover in GSM.

- The signalling over the Iu-interface at call set up to/from a dual mode UMTS/GSM mobile station, shall include GSM information elements needed for handover from UMTS to GSM.
  In the corresponding way the signalling over the A-interface at call set up to/from a dual mode UMTS/GSM mobile shall include UMTS elements needed for handover from GSM to UMTS.
  The data are needed to initiate the handover towards the new BSS/RNC.

- A target cell based on CGI is sent to the MSC from UTRAN at handover from UMTS to GSM. The CGI points out the target MSC and target BSC.

- A target cell based on CGI is sent to the MSC from the BSS at handover from GSM to UMTS. The CGI points out the target UMTS MSC and target RNC (UMTS MSC does the translation from CGI to RNC identity).

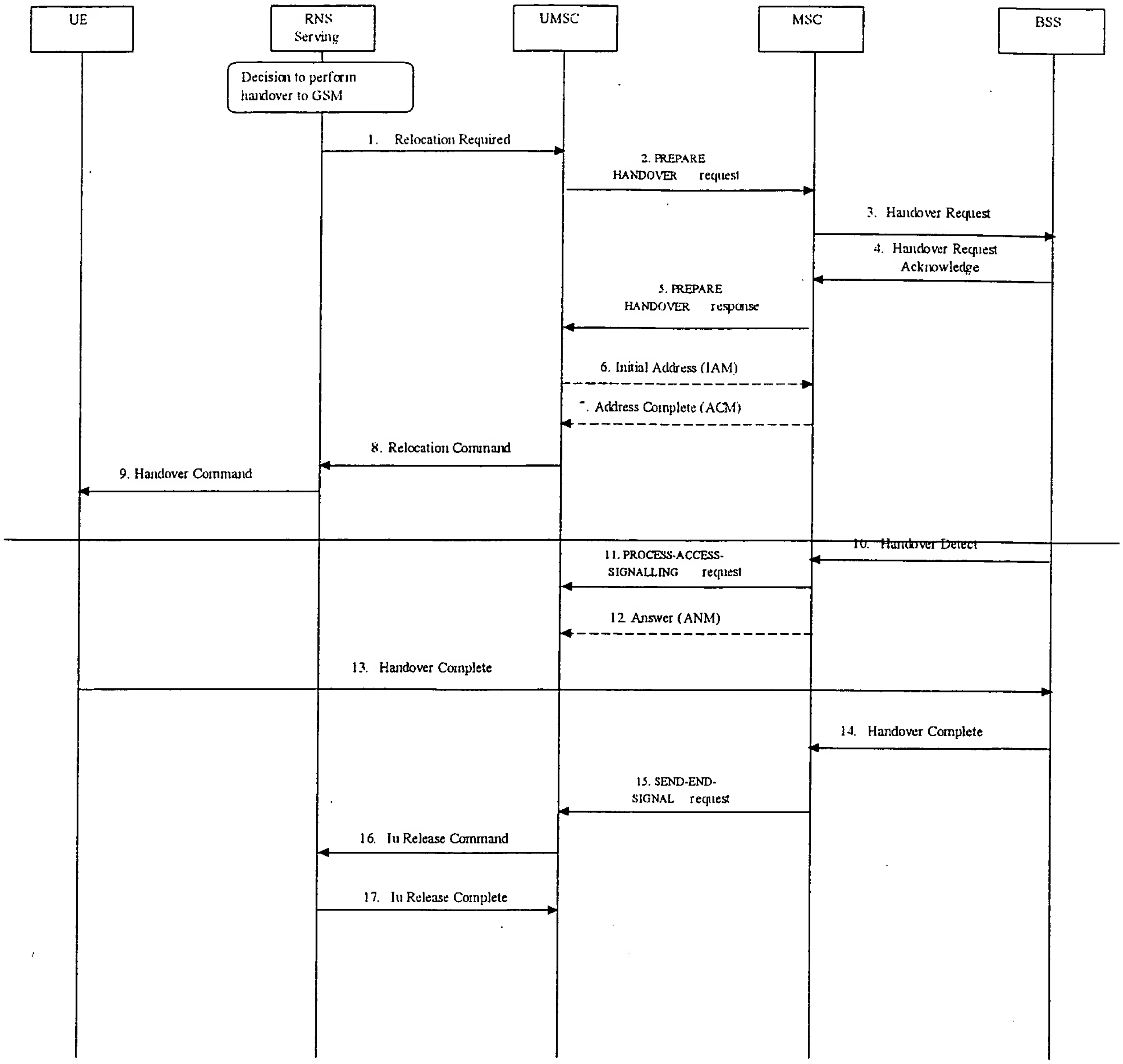
6.1.1 UMTS to GSM handover for circuit switched services

UMTS to GSM handover for circuit switched services is detailed in 23.009.

~~The signalling sequence in Figure 6-2 shows the case when the UMTS MSC (UMSC) and the GSM MSC are located in separate "physical" nodes.~~

~~If the UMSC and MSC are located within the same "physical" node, no MAP signalling and no ISUP signalling are needed between UMSC and MSC.~~

~~For release 99 it is expected that the codec is placed in the anchor or non-anchor UMSC (for the UE in UMTS mode), which will have no impact on the signalling.~~



~~**Figure 6-2. UMTS to GSM handover for circuit switched services e.g. voice**~~

~~1)SRNS initiates the preparation of UMTS to GSM Handover by sending the RANAP message Relocation Required to UMSC. This message includes parameters such as Target cell identification and Serving cell identification, both in the form of CGI according to GSM.~~

~~2)UMSC requests MSC to prepare for UMTS to GSM Handover, by sending the MAP message PREPARE HANDOVER request. The message contains a BSSMAP message Handover Request, to be sent from MSC to BSS. It includes data such as Target and Serving CGI received from the Relocation Required message, and data stored in UMSC indicating type of radio resources required.~~

~~3)MSC sends the BSSMAP message Handover Request to BSS which then allocates necessary radio resources in BSS.~~

~~4)When BSS has allocated necessary radio resources it sends the BSSMAP message Handover Request Acknowledge. This message contains all radio-related information that the UE needs for handover, i.e. a complete GSM Handover Command message to be sent transparently via MSC, UMSC, and SRNS to UE.~~

~~5)MSC acknowledges handover preparation by sending the MAP message Prepare Handover Respons to UMSC, including a complete GSM Handover Command message.~~

~~6)UMSC sends the ISUP message IAM to MSC to establish a circuit ISUP connection between UMSC and MSC~~.

~~7)As acknowledgement to IAM, MSC sends the ISUP message ACM back to UMSC~~.

~~8)UMSC sends the RANAP message Relocation Command to SRNS, including a complete GSM Handover Command message to be sent to UE~~.

~~9)SRNS sends the RRC message Handover Command to UE, including a complete GSM handover Command message, to order the UE to start the execution of handover~~.

~~10)Upon detection of UE in BSS, (by reception of the Layer1 GSM message Handover Access from the UE), which indicates that the correct UE has successful accessed the radio resource in the target GSM cell, the BSSMAP message Handover Detect is sent from BSS to MSC. MSC may use this condition to switch the connection to the BSS.~~

~~11)MSC sends the MAP message PROCESS-ACCESS-SIGNALLING request to UMSC, including the BSSMAP message Handover Detect. UMSC may use this message as trigger point for switch of the connection to the MSC.~~

~~12)To complete the ISUP signalling the ISUP message ANM is sent from MSC to UMSC~~.

~~13)After Layer 1 and 2 connections are successfully established, the UE sends the GSM message Handover Complete to BSS.~~

~~14)After completed handover, BSS sends the BSSMAP message Handover Complete to MSC~~.

~~15)MSC sends the MAP message SEND-END-SIGNAL request to UMSC, including the BSSMAP message Handover Complete.~~

~~16)UMSC initiates release of resources allocated by the former SRNS~~.

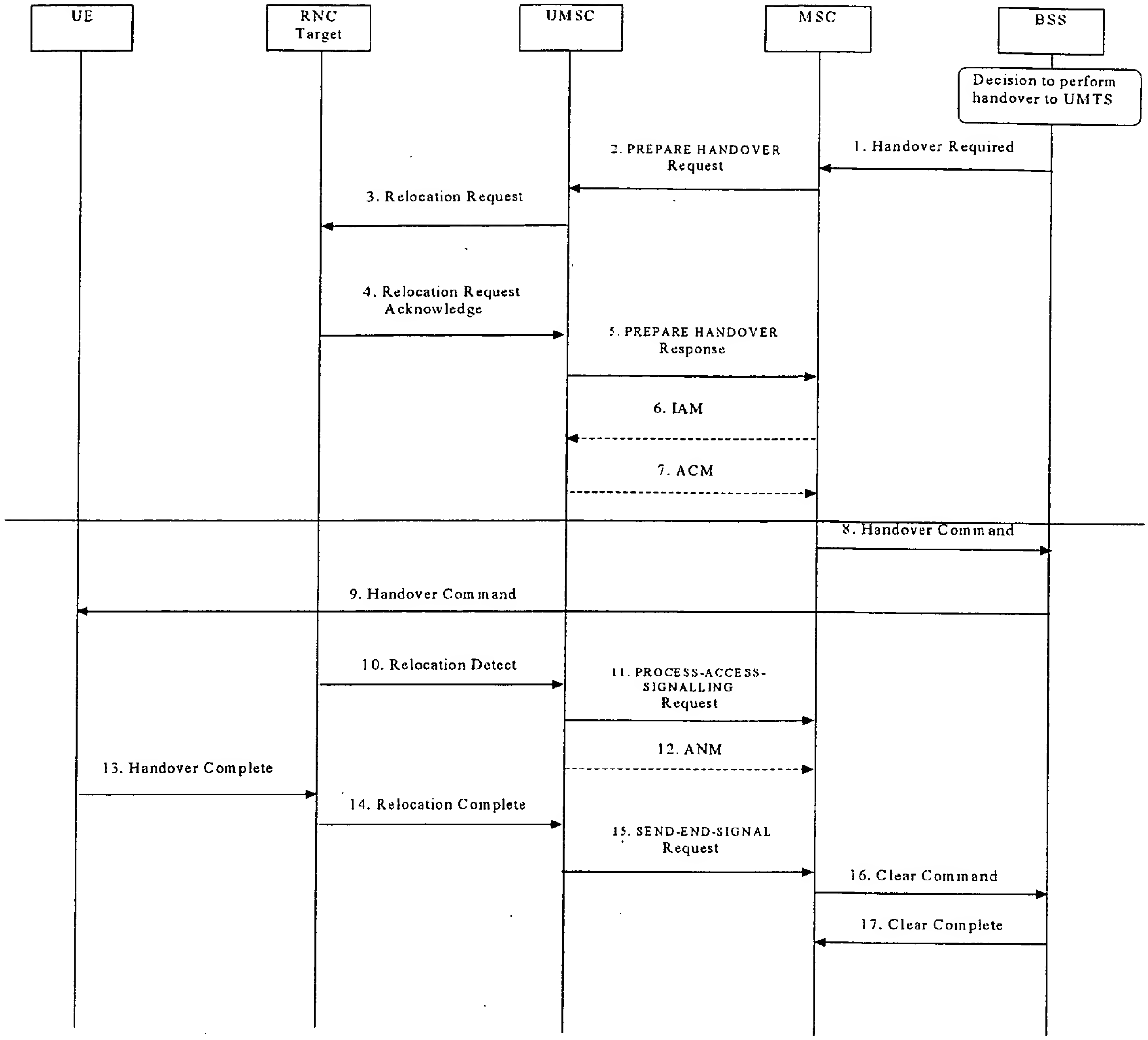
~~17)~~1) ~~SRNS acknowledges release of resources~~.

6.1.2 GSM to UMTS handover for circuit switched services

UMTS to GSM handover for circuit switched services is detailed in 23.009~~. The signalling sequence in figure 6-3 shows the case when the UMTS MSC (UMSC) and the GSM MSC are located in separate "physical" nodes~~.

~~If the UMSC and MSC are located within the same "physical" node, no MAP signalling and no ISUP signalling are needed between UMSC and MSC~~.

~~For release 99 it is expected that the codec is placed in the anchor or non-anchor UMSC (for the UE in UMTS mode), which will have no impact on the signalling.~~



~~**Figure 6-3. GSM to UMTS handover for circuit switched services e.g. voice**~~

~~1.BSS initiates the preparation of GSM to UMTS Handover, by sending the BSSMAP message Handover Required to MSC. This message includes parameters such as Target cell identification as CGI, and information to be sent further transparent to Target RNC via MSC and UMSC.~~

~~2.MSC requests UMSC to prepare for GSM to UMTS Handover, by sending the MAP message PREPARE HANDOVER Request. This message includes parameters such as Target cell identification and Serving cell identification, both in the form of CGI, and information to be sent transparent to the Target RNC via UMSC.~~

~~3.UMSC requests Target RNC to prepare for GSM to UMTS Handover, by sending the RANAP message Relocation Request. UMSC translates the Target cell identification (CGI) received in the MAP message PREPARE HANDOVER Request, to a RNC pointer to address the Target RNC. This message includes parameters such as bearer related information, and information received in the MAP message Prepare Handover Request to be sent transparent to the Target RNC.~~

~~4.When Target RNC has allocated necessary radio resources it sends the RANAP message Relocation Request Acknowledge to UMSC. This message contains all radio-related information that the UE needs for handover, i.e. a complete RRC message to be sent transparently via UMSC, MSC and BSS to the UE.~~

~~5.UMSC sends the MAP message PREPARE HANDOVER Response to MSC including a complete~~

~~RRC message, to be sent transparent to UE via MSC and BSS.~~

~~6.MSC sends the ISUP message IAM to UMSC to establish a circuit ISUP connection between MSC and UMSC~~

~~7.As acknowledgement to IAM, UMSC sends the ISUP message ACM back to MSC.~~

~~8.MSC sends the BSSMAP message Handover Command to BSS, including a complete RRC message to be sent transparent to UE via BSS.~~

~~9.BSS sends the GSM message Handover Command to UE including a complete RRC message, to order the UE to start execution of handover.~~

~~10.Upon detection of the UE in Target RNC, Target RNC starts acting as SRNC for the UE, and the RANAP message Relocation Detect is sent from RNC to UMSC.~~

~~11.At reception of the RANAP message Relocation Detect, the UMSC sends the MAP message PROCESS-ACCESS SIGNALLING Request to MSC. MSC may use this message as trigger point for switch of the connection to the UMSC.~~

~~12.To complete the ISUP signalling the ISUP message ANM is sent from UMSC to MSC.~~

~~13.After completed handover, UE sends the RRC message Handover Complete to Target RNC.~~

~~14.Target RNC sends the RANAP message Relocation Complete to UMSC.~~

~~15.UMSC forwards the RANAP message Relocation Complete in the MAP message SEND END SIGNAL Request to MSC.~~

~~16.MSC initiates release of resources allocated by BSS.~~

~~BSS acknowledges release of resources.~~

6.2 Packet Switched Handover and Roaming Principles

The introduction of a UMTS core Network illustrates the requirement for inter-connection with the legacy GSM system to allow inter-PLMN roaming and handover.

Even though there is no current GPRS deployment, the operator may decide to deploy a GPRS network prior to the deployment of a UMTS network. Therefore, the introduction of a UMTS Core Network may require to be inter-connected to the legacy packet network.

As in the circuit switched case, roaming andhandover to/from UMTS should be performed in the simplest manner that requires as little change as possible to the GPRS network and standards, i.e. inter-GSNhandover functionality. In addition, access is provided to the GPRS network using the existing subscriber profiles and current network interfaces.

A similar figure to Figure 6-1 is illustrated in Figure 6-4. Notice that it also leaves the current GPRS specifications mainly untouched whereupon the UMTS core network acts towards the GSN like a GSN by providing for example Gn. Further, it should be observed that GPRS subscriptions belong to the HLR whilst UMTS subscriptions exist in the HLR release 99.

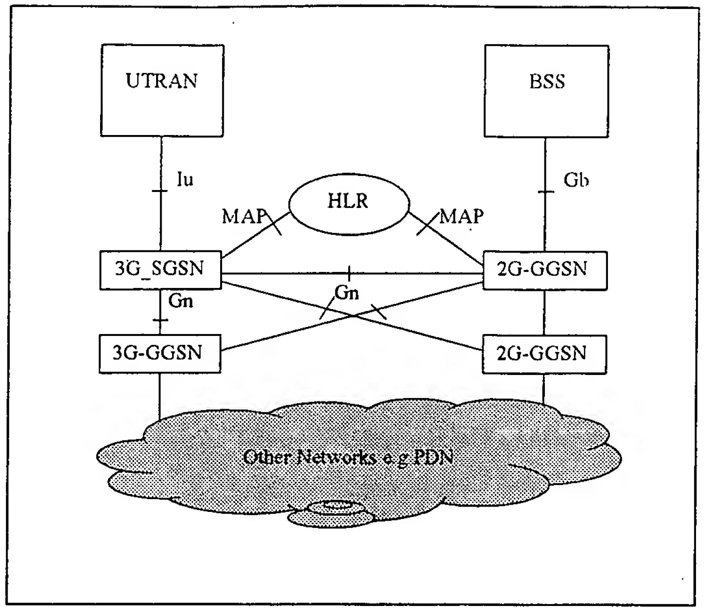


Figure 6-4: Inter-Operability between GSNs and UMTS

Note: No physical implementation should be taken from Figure 6-4. As a further note, nointerworking functions are shown to ease clarity, but however should not be precluded.

From Figure 6-4 it can be seen that to provide inter-working between legacy packet switched and UMTS packet switched services, the information exchanged over the Iu must provide the necessary parameters to enable the core networks to communicate via for example the Gn interface for handover purposes.

Also note that from the above diagram, the same principles are used as in the circuit switched services to provide seamless roaming.

6.2.1 Implications

- The active PDP context resides in the same GGSN even after a handover between GSM and UMTS (both directions). This corresponds in principle to the anchor concept on the circuit switched side, but note that whereas packet sessions are long lived, the anchor MSC remains only for the duration of a CS call (typically much shorter than a packet session).
- Assuming an internal structure in UMTS CN that contains logical GGSN and SGSN nodes, the signalling over the inter-system GGSN-SGSN interface should be a joint evolution of Gn for the GSM system and UMTS. I.e., when Gn evolves in the sequence of GSM releases, Gn should include any new or updated information necessary for interoperation.
- The corresponding SGSN-SGSN inter-system interface (also Gn) should also be evolved together. However, in this case the changes relative to the current GPRS release may possibly be more profound.

6.2.2 Signalling procedures

The signalling procedures shows how handover UMTS <-> GSM GPRS can be done. The parameters carried by each message is not complete and shall be seen as examples of important information carried be the messages.

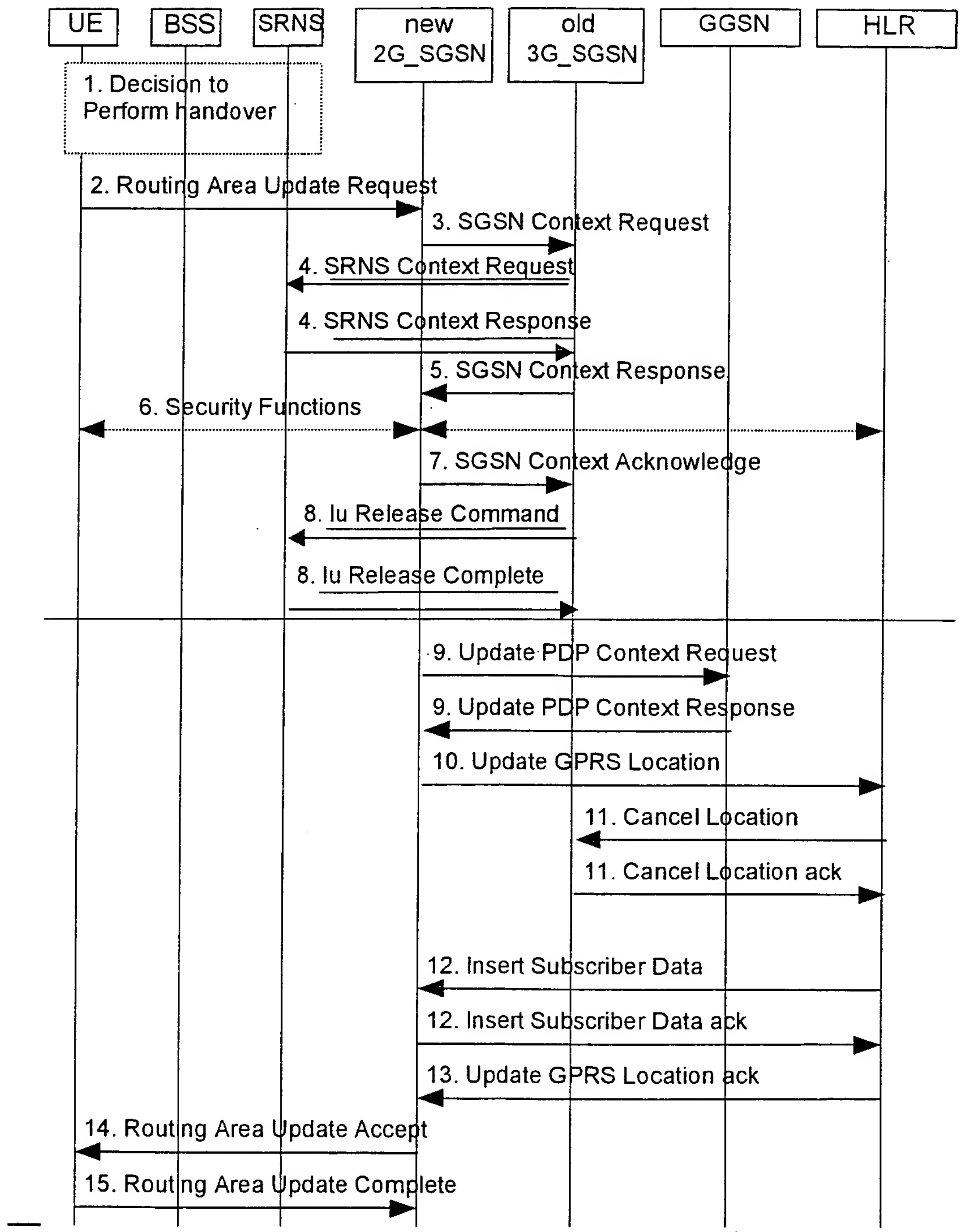
The signalling sequences shows the case when the UMTS 3G_SGSN and the GPRS 2G_SGSN are located in separate "physical" nodes.

If the 3G_SGSN and 2G_SGSN are located within the same "physical" node, no signalling are needed between 3G_SGSN and 2G_SGSN.

For handover in the UMTS to GSM GPRS direction the intention is to re-use the handover principles of GSM GPRS today in order to limit the changes in GSM GPRS and to take the changes if any on the UMTS side. The below specified messages is standard GSM 2+ messages (when applicable)

6.2.2.1 Handover from UMTS to GSM GPRS

Handover from UMTS to GSM GPRS is detailed in 23.060.



~~Figure 6-5: UMTS to GSM GPRS, Inter SGSN Routing Area Update Procedure~~

~~1)The UE [2] or UTRAN [2] decides to perform handover which leads to that the UE switch to the new cell under the new system.~~

~~2)The UE sends a Routing Area Update Request (old RAI, old P-TMSI) to the new 2G_SGSN. The BSS shall add the Cell Global Identity including the RAC and LAC of the cell where the message was received before passing the message to the 2G_SGSN~~.

~~3)The new 2G_SGSN sends SGSN Context Request (old RAI, old P-TMSI, New SGSN Address) to the old 3G_SGSN to get the MM and PDP contexts for the UE (The old RAI received from the UE is used to derive the old 3G_SGSN address).~~

~~4)Old 3G_SGSN sends SRNS Context Request to SRNS in order to receive the GTP-PDU sequence numbers of the GTP-PDUs to be next sent between UE and GGSN. SRNS responds with SRNS CONTEXT RESPONSE including the GTP_PDU sequence numbers and sequence numbers of last successfully received UL RLC-PDUs.~~

~~5)The old 3G_SGSN responds with SGSN Context Response (MM Context, e.g. IMSI, PDP Contexts, e.g. APN~~).

~~6)Security functions may be executed.~~

~~7)The new 2G_SGSN sends an SGSN Context Acknowledge message to the old 3G_SGSN. This informs the old 3G_SGSN that the new 2G_SGSN is ready to receive data packets belonging to the activated PDP contexts~~.

~~8)Old 3G_SGSN sends Iu Release Command to SRNS. In case of lossless handover this message indicates the IP address to be used to return the unsent DL GTP-PDUs. Upon reception of this message the SRNS starts to return GTP-PDUs to old 3G_SGSN. SRNS responds with Iu Release Complete~~.

~~9)The new 2G_SGSN sends Update PDP Context Request (new SGSN Address) to the GGSN concerned. The GGSN update their PDP context fields and return Update PDP Context Response~~.

~~10)The new 2G_SGSN informs the HLR of the change of SGSN by sending Update GPRS Location (SGSN Number, SGSN Address, IMSI) to the HLR~~.

~~11)The HLR sends Cancel Location (IMSI) to the old 3G_SGSN. The old 3G_SGSN removes the MM and PDP contexts.~~
~~The old 3G_SGSN acknowledges with Cancel Location Ack (IMSI)~~.

~~12)The HLR sends Insert Subscriber Data (IMSI, GPRS subscription data) to the new 2G_SGSN. The 2G_SGSN constructs an MM context for the UE and returns an Insert Subscriber Data Ack (IMSI) message to the HLR~~.

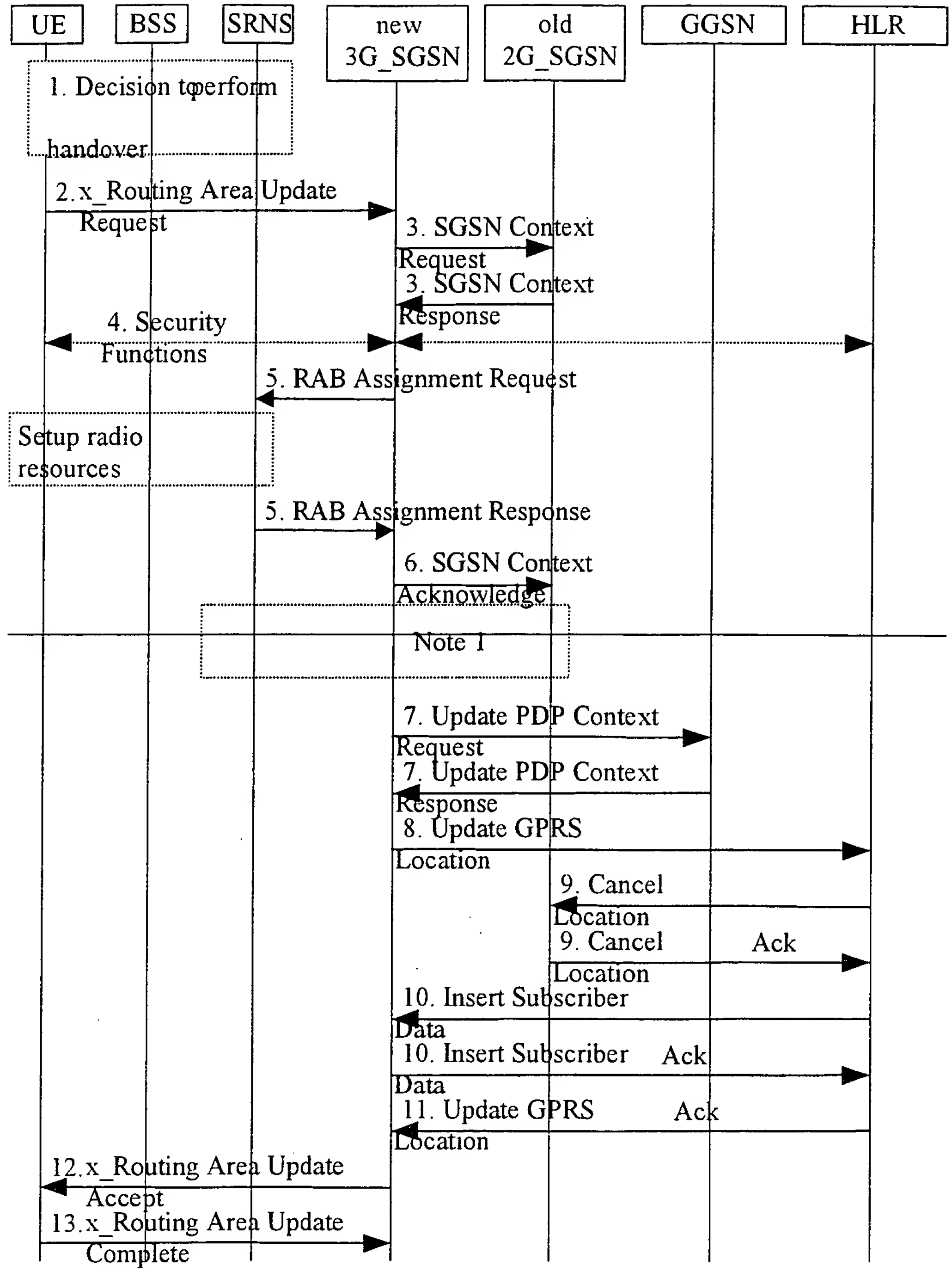
~~13)The HLR acknowledges the Update Location by sending Update GPRS Location Ack (IMSI) to the new 2G_SGSN.~~

~~14)The new 2G_SGSN validates the UE's presence in the new RA. The new 2G_SGSN constructs MM and PDP contexts for the UE. A logical link is established between the new 2G_SGSN and the UE. To avoid data duplication the sequence numbers of the RLC link that was used before the handover may be used to initialise the logical link. The new 2G_SGSN responds to the UE with Routeing Area Update Accept (P-TMSI).~~

~~15)The UE acknowledges the new P-TMSI with a Routing Area Update Complete (P-TMSI)~~.

6.2.2.2 Handover from GSM GPRS to UMTS

Handover from GSM GPRS to UMTS is detailed in 23.060.



~~Figure 6-6: GSM GPRS to UMTS, Inter SGSN Routing Area Update Procedure~~

~~1)The UE/network decides to perform handover which leads to that the UE switch to the new cell, details for this is FFS.~~

~~2)The UE sends a x_Routing Area Update Request (old RAI, old P-TMSI) to the new 3G_SGSN. The SRNS shall add an identifier of the area where the message was received before passing the message to the 3G_SGSN.~~

~~3)The new 3G_SGSN sends SGSN Context Request (old RAI, old P-TMSI, New SGSN Address) to the old 2G_SGSN to get the MM and PDP contexts for the UE (The old RAI received from the UE is used to derive the old 2G_SGSN address). The old 2G_SGSN responds with SGSN Context Response (MM Context, e.g. IMSI, PDP Contexts, e.g. APN).~~

~~4)Security functions may be executed.~~

~~5)The new 3G_SGSN request the SRNS to establish of a radio access bearer by sending RAB Assignment Request to the SRNS. The SRNS responds with RAB Assignment Response.~~

~~6)The new 3G_SGSN sends an SGSN Context Acknowledge message to the old 2G_SGSN. This informs the old 2G_SGSN that the new 3G_SGSN is ready to receive data packets belonging to the activated PDP contexts.~~

~~7)The new 3G_SGSN sends Update PDP Context Request (new SGSN Address) to the GGSN concerned. The GGSN update their PDP context fields and return Update PDP Context Response.~~

~~8)The new 3G_SGSN informs the HLR of the change of SGSN by sending Update GPRS Location (SGSN Number, SGSN Address, IMSI) to the HLR.~~

~~9)The HLR sends Cancel Location (IMSI) to the old 2G_SGSN. The old 2G_SGSN removes the MM and PDP contexts.~~
~~The old 2G_SGSN acknowledges with Cancel Location Ack (IMSI).~~

~~10)The HLR sends Insert Subscriber Data (IMSI, GPRS subscription data) to the new 3G_SGSN. The 3G_SGSN constructs an MM context for the UE and returns an Insert Subscriber Data Ack (IMSI) message to the HLR.~~

~~11)The HLR acknowledges the Update GPRS Location by sending Update Location Ack (IMSI) to the new 3G_SGSN.~~

~~12)The new 3G_SGSN validates the UE's presence in the new RA. The new 3G_SGSN constructs MM and PDP contexts for the UE. A logical link is established between the new SGSN and the UE. The new 3G_SGSN responds to the UE with x_Routing Area Update Accept (P-TMSI).~~

~~13)The UE acknowledges the new P-TMSI with a x_Routing Area Update Complete (P-TMSI).~~

~~Note 1: The functionality for forward of packets and handling of GTP sequence numbers (within the box) is a subject fore more investigation, i.e. FFS. The GPRS principles should apply.~~

Annex A (Informative)Reduction of UMTS signalling

A.1.1 GLR Concept

The benefit of the Gateway Location Register (GLR) is the reduction in signalling traffic between networks. GLR is an optional network element which shall not affect the MAP protocol.

A.1.1.1 Overview of the GLR Concept

The GLR is a node between the VLR and the HLR, which may be used to optimise the handling of subscriber location data across network boundaries.

In Figure 1, the GLR interacts with HLRa and VLRb for roamers on Network B. The GLR is part of the roaming subscriber's Home Environment. When a subscriber to HLRa is roaming on Network B the GLR plays the role of an HLR towards VLRb and the role of a VLR towards HLRa. The GLR handles any location change between different VLR service areas in the visited network without involving HLRa.

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23.121 CR 57rev1 Current Version: 3.2.1

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to: TSG#7	for approval [X]	strategic [ ]	(for SMG use only)
list expected approval meeting # here ↑	for information [ ]	non-strategic [ ]	

Form: CR cover sheet, version 2 for 3GPP and SMG The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]
(at least one should be marked with an X)

Source: Lucent Technologies **Date:** 25 Jan., 2000

Subject: Removal of FFS items in 23.121

Work item:

Category:				**Release:**	
	F	Correction	[ ]	Phase 2	[ ]
	A	Corresponds to a correction in an earlier release	[ ]	Release 96	[ ]
(only one category	B	Addition of feature	[ ]	Release 97	[ ]
shall be marked	C	Functional modification of feature	[ ]	Release 98	[ ]
with an X)	D	Editorial modification	[X]	Release 99	[X]
				Release 00	[ ]

Reason for change:

In section 4.3.1.1 the ffs item has been resolved within N1 and S2, see 23.060.

Section 4.3.2.1.5, the nature of the timers referred to in this section have now been defined between RAN and S2. References have been added to the relevant specifications.

Section 4.3.14.1.1 and 4.3.14.1.2 are changed as agreed by RAN3/S2, see for example 23.060.

Section 4.3.14.1.5, behaviour is as defined.

Section 4.3.14.4 deleted.

- Detailed procedures for 2G to 3G handover are covered in 23.060.
- The logical/physical characteristics are specified within the RAN Iu set of documents. (25.410-25.415).
- Combined MAP procedures are not in R99

Section 6,

- a reference has been added to the S1 document on GSM-UMTS Interoperability.
- The case outlined in the last sentence is covered by the selective RAU procedure in 23.060.

Clauses affected: 4.3.1.1, 4.3.2.1.5, 4.3.14.1.1, 4.3.14.1.2, 4.3.14.1.5, 4.3.14.4, 6

Other specs affected:	Other 3G core specifications		→ List of CRs:
	Other GSM core specifications		→ List of CRs:
	MS test specifications		→ List of CRs:
	BSS test specifications		→ List of CRs:
	O&M specifications		→ List of CRs:

Other comments:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

In RRC Idle mode it is the broadcasted MM system information (e.g. information about the present Location Area and present Routing Area) that determines when the UE initiates a location registration procedure towards the CN. An UE in state CS-IDLE will in RRC Idle mode, initiate Location Area update towards the CN when crossing LA border. An UE in state PS-IDLE will in RRC Idle mode initiate Routing Area update towards the CN when crossing RA border.

In RRC Connected mode, the UE receives the MM system information on the established RRC connection. (I.e. the broadcasted MM system information is not used by the UE in the RRC connected mode.) An UE in state CS-IDLE will, in RRC Connected mode, initiate Location Area update towards the CN when receiving information indicating a new Location Area. An UE in state PS-IDLE will, in RRC Connected mode, initiate Routing Area update towards the CN when receiving information indicating a new Routing Area. An UE in state CS-CONNECTED will, in RRC Connected mode, not initiate Location Area update towards the CN. An UE in state PS- CONNECTED will, in RRC Connected mode, not initiate Routing Area update towards the CN.

In CS-DETACHED mode the UE will not initiate any Location Area update and this independent of the RRC mode. In PS-DETACHED mode the UE will not initiate any Routing Area update and this independent of the RRC mode.

In additional to normal location registration when changing registration area, the UE may (network options) perform CS periodic registration when in CS-IDLE state and PS periodic registration when in PS-IDLE state. The respective periodic registration may be on/off on Location Area respective Routing Area level.

On the Mobility Management level, IMSI and CS related TMSI are used as UE identities in the CS service domain, and IMSI and PS related TMSI are used as UE identities in the PS service domain. The IMSI is the common UE identity for the two CN service domains.

A signalling connection between the UE and the CN refers to a logical connection consisting of an RRC connection between UE and UTRAN and an Iu signalling connection ("one RANAP instance") between the UTRAN and the CN node. The CS service domain related signalling and PS service domain related signalling uses one common RRC connection and two Iu signalling connections ("two RANAP instances"), i.e. one Iu signalling connection for the CS service domain and one Iu signalling connection for the PS service domain.

4.3.1.1 Use of combined procedures for UMTS

The use of separated PS and CS mobility mechanisms within the UE and within the CN may lead to non-optimal usage of the radio resource (for example a UE in PS idle and CS idle state would perform both location updates (for the CS mechanism) and Routing area updates (for PS mechanisms)).

UMTS should optimise the use of radio resources., The use of combined updates (similar to the current GSM/GPRS Gs combined update mechanism) may enable this. To offer flexibility in the provision of mobility management for UMTS, it should be possible to use combined mechanisms for location management purposes as well as for attach/detach status purposes.

From the UE perspective it should be possible for the UE to perform combined update mechanisms (operator option). UMTS Phase 1 R99 terminals should support the use of both combined and separate mechanisms. The support of this feature by all UMTS mobiles will also ease evolution of UMTS MM in the future.

In the UMTS specifications the RAN will not co-ordinate mobility management procedures that are logically between the core network and the MS. This includes: location management, authentication, temporary identity management and equipment identity check.

~~The issues of security, temporary identifiers, CS and PS periodic registrations and PS DETACHED/CS DETACHED need to be studied.~~

4.3.2 Description of the Location Management and Mobility Management Concept

4.3.2.1 Area concepts

For the mobility functionality four different area concepts are used. Location Area and Routing Area in the CN as well as UTRAN Registration Area and Cell areas in the UTRAN.

Area Concepts
(Concepts not shown)

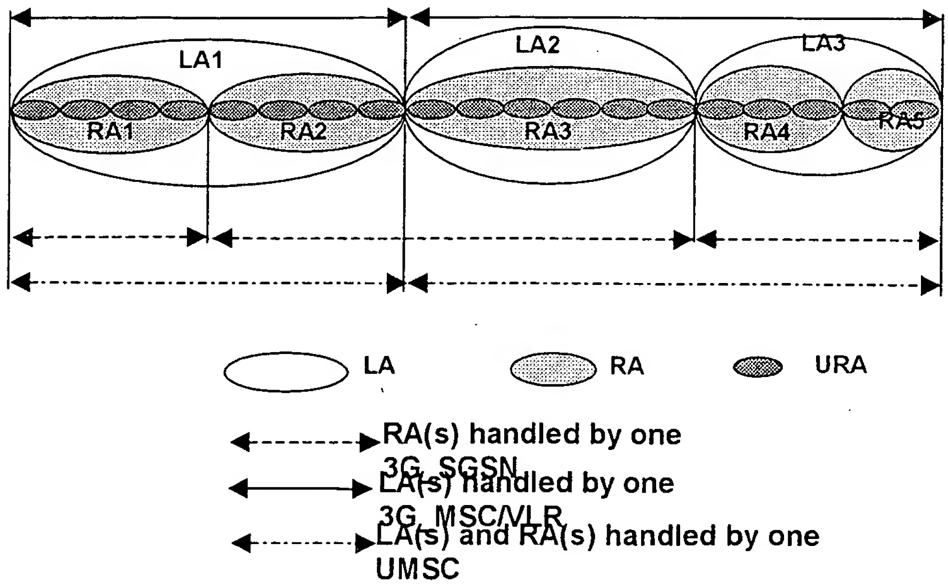

Figure 4-10: Relationship between different areas.

4.3.2.1.5 Hierarchical tracking concept

A packet UE (in RRC connected mode) is tracked at the cell level by RNC during an active connection.

A packet UE (in RRC connected mode) is tracked at the URA level by RNC when no data are actively transfer, and the probability of data transfer is quite high.

A packet UE (in PS-Idle state) is tracked at the Routing Area level by SGSN when no data is actively transfered and the probability of data transfer is quite low.The network operator should be able to optimise paging and updating load by controling the size of the different areas and the probability of data transfer (controlled by the RRC_connection_release timer). For example, one operator may decide that URA are small, and that RRC connection are released after a relatively short time of inactivity, so that most attached packet UE are tracked in the Routing Area level (optimum for packet UE mainly using client-server type of service).

Another operator may decide that URA are large, and that RRC connection are released only if RRC connection is lost, so that most attached packet UE are tracked at the URA level.

The procedure for the releasing of the RRC connection can be found in 23.060 under the Iu release procedure. The URA update procedures can be found in 25.331.

~~Different timer values are required for the URA Update Timer and for the RRC Connection Release Timer. It is for further study whether the duration of the RRC_Connection_Release timer is set on a per UE basis, or configurable by the operator to be the same for all UE.~~

4.3.3 Relationship between MM and SM states for an UE

When a UE is attached to PS service, it may have or not some PDP context established.

If the UE has no PDP context established (SM-Inactive), no radio access bearer are established for PS service. The UE is in RRC connected mode, only if the state is UMTS CS-CONNECTED state or UMTS PS-CONNECTED state (i.e. only a PS signaling connection is established).

If the UE has at least one PDP context established (SM-Active), the UE may be in UMTS PS-CONNECTED state or in UMTS PS-IDLE state.

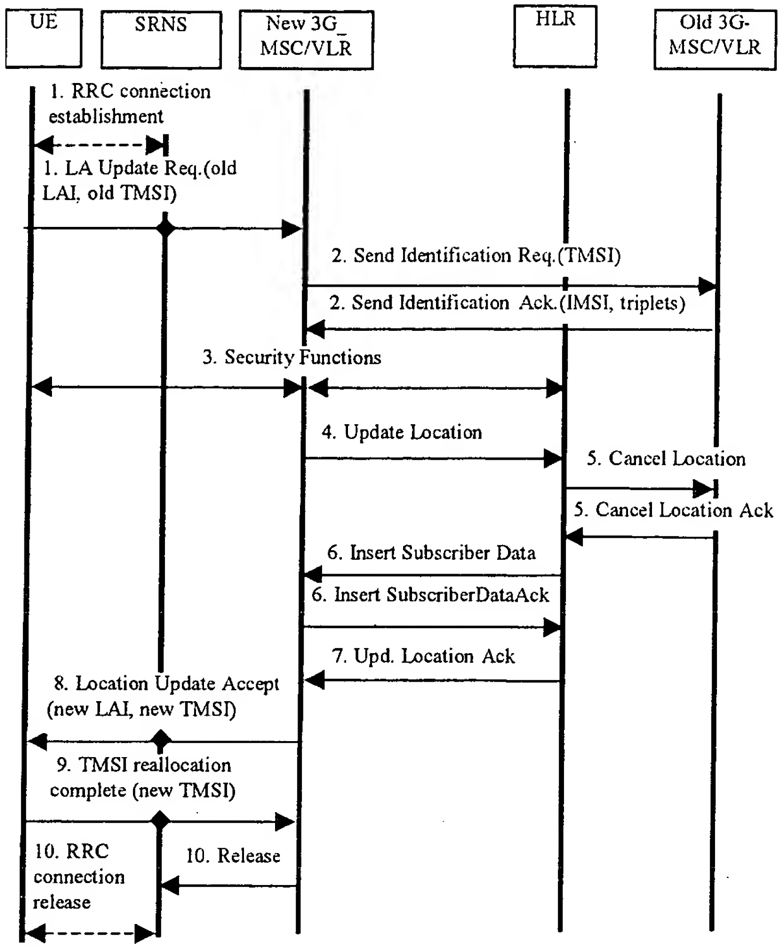

Figure 4-17: Interface information transfer for location update when changing VLR area

- The RRC connection is established, if not already done. The UE sends the initial message Location Area Update Request (old TMSI, old LAI, etc.) to the new 3G_MSC/VLR. The old TMSI and the old LAI are assigned data in UMTS. The SRNS transfers the message to the 3G_MSC/VLR. The sending of this message to 3G_MSC/VLR will also imply establishment of a signalling connection between SRNS and 3G_MSC/VLR for the concerned UE. ~~The 3G_MSC/VLR determines the new Location Area for the UE. Whether the 3G_MSC/VLR derives the new LAI from information supplied by the UE or by the SRNS is ffs.~~ The UTRAN shall add the RAC and the LAC of the cell where the message was received before passing the message to the MSC.

- The new 3G_MSC/VLR sends an Send Identification Request (old TMSI) to the old 3G_MSC/VLR to get the IMSI for the UE. (The old LAI received from UE is used to derive the old 3G_MSC/VLR identity/address.) The old 3G_MSC/VLR responds with Send Identification Ack. (IMSI and Authentication triplets).

- Security functions may be executed.

- The new 3G_MSC/VLR inform the HLR of the change of 3G_MSC/VLR by sending Update Location (IMSI, MSC address, VLR number) to the HLR.

- The HLR cancels the context in the old 3G_MSC/VLR by sending Cancel Location (IMSI). The old 3G_MSC/VLR removes the context and acknowledges with Cancel Location Ack .

- The HLR sends Insert Subscriber Data (IMSI, subscription data) to the new 3G_MSC/VLR. The new 3G_MSC/VLR acknowledges with Insert Subscriber Data Ack.

- The HLR acknowledges the Update Location by sending Update Location Ack. to the new 3G_MSC/VLR.

- The RRC connection is established, if not already done. The UE sends the initial message Routing Area Update Request (old P-TMSI, old RAI, etc.) to the new 3G_SGSN. The old P-TMSI and the old RAI are assigned data in UMTS. The SRNS transfers the message to the 3G_SGSN. The sending of this message to 3G_SGSN will also imply establishment of a signalling connection between SRNS and 3G_SGSN for the concerned UE. The UTRAN shall add the RAC and the LAC of the cell where the message was received before passing the message to the SGSN.

~~The 3G_SGSN determines the new Routing Area for the UE. Whether the 3G_SGSN derives the new RAI from information supplied by the UE or by the SRNS is ffs.~~

- The new 3G_SGSN send an SGSN Context Request (old P-TMSI, old RAI) to the old 3G_SGSN to get the IMSI for the UE. (The old RAI received from UE is used to derive the old 3G_SGSN identity/address.) The old 3G_SGSN responds with SGSN Context Response (e.g. IMSI, PDP context information and Authentication triplets).

- Security functions may be executed.

- The new 3G_SGSN informs the HLR of the change of 3G_SGSN by sending Update GPRS Location (IMSI, SGSN number, SGSN address) to the HLR.

- The HLR cancels the context in the old 3G_SGSN by sending Cancel Location (IMSI). The old 3G_SGSN removes the context and acknowledges with Cancel Location Ack.

- The HLR sends Insert Subscriber Data (IMSI, subscription data) to the new 3G_SGSN. The new 3G_SGSN acknowledges with Insert Subscriber Data Ack.

- The HLR acknowledges the Update GPRS Location by sending Update GPRS Location Ack. to the new 3G_SGSN.

- The new 3G_SGSN validate the UEs presence in the new RA. If due to regional, national or international restrictions the UE is not allowed to attach in the RA or subscription checking fails, then the new 3G_SGSN rejects the Routing Area Update Request with an appropriate cause. If all checks are successful, then the new 3G_SGSN responds to the UE with Routing Area Update Accept (new P-TMSI, new RAI, etc.).

- The UE acknowledges the new P-TMSI with Routing Area Update Complete.

- When the location registration procedure is finished, the 3G_SGSN may release the signalling connection towards the SRNS for the concerned UE. The SRNS will then release the RRC connection if there is no signalling connection between 3G_MSC/VLR and SRNS for the UE.

4.3.14.1.3 Periodic Registration towards both CN nodes without use of Gs

This example shows Periodic Registration to both the 3G_MSC/VLR and the 3G-SGSN (i.e. no change of registration areas) when the UE is in MM idle state and registered in both the 3G_SGSN and the 3G_MSC/VLR.

The illustrated transfer of MM signalling to/from the UE uses an established RRC connection. This RRC connection will be established, is in this case, only for the two registration procedures towards the 3G_SGSN and 3G_MSC/VLR.

For each indicated MM message sent to/from UE, the CN discriminator indicates either 3G_ SGSN or 3G_MSC/VLR.

4.3.14.1.4 Periodic Registration with use of Gs/UMSC

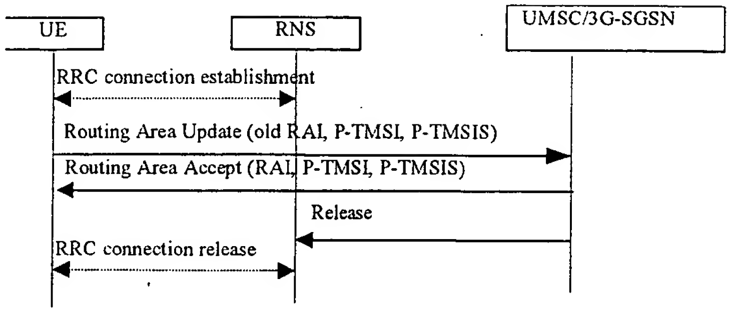

Figure 4-20: Periodic update procedure when the MS is attached for both CS and PS services

An RRC connection is established for the periodic registration. Note that this procedure is invoked only when the UE is in MM-idle state. The UE sends a Routing Area Update to the UMSC. The UMSC authenticates the P-TMSI signature. If the update is successful it sends a Routing Area Accept message. The RRC connection is then released.

4.3.14.1.5 UE initiated Combined Detach Procedure when using Gs/UMSC

The UE-Initiated Detach procedure when initiated by the UE is illustrated in Figure 4-21. Each step is explained in the following list.

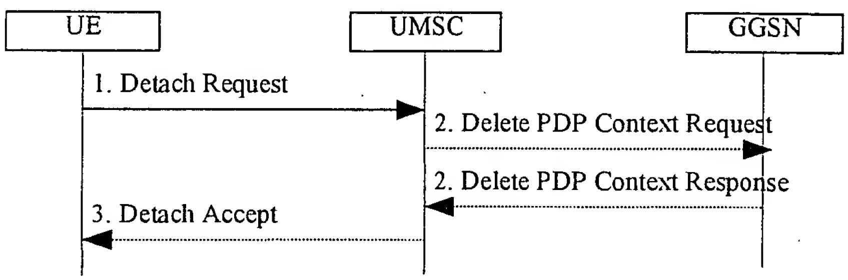

Figure 4-21: UE-Initiated Combined Detach Procedure (The procedure for combined detach when using Gs is as defined in GSM 03.60)

- 1) The UE detaches by sending Detach Request (Detach Type, Switch Off) to the UMSC. Detach Type indicates which type of detach that is to be performed, i.e., PS Detach only, CS Detach only or combined Detach. Switch Off indicates whether the detach is due to a switch off situation or not.
- If PS detach, any active PDP contexts in the GGSNs regarding this particular UE may be deactivated. ~~This is FFS~~
- If Switch Off indicates that the detach is not due to a switch off situation, the UMSC sends a Detach Accept to the UE.

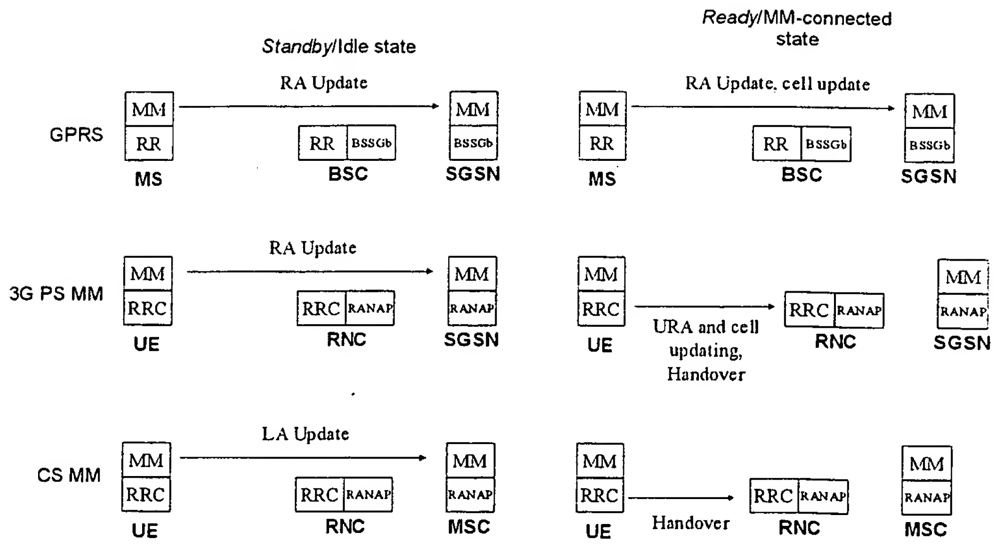

Figure 4-31 The states written in italics correspond to those defined in GSM with GPRS.

4.3.14.3.1 PS -idle state

The RA update procedure is utilised to update the whereabouts of the UE into SGSN. The updating into SGSN takes place irrespectively of the CS MM state in MSC.

4.3.14.3.2 PS -connected state

The URA and cell updating and handover procedures presented in Figure 4-31 are based on UMTS YY.03 [2]. In brief, the aim in [2] is to introduce functionality that caters for the same functionality as standby/ready in GPRS. The RRC shall be designed in such a fashion, which allows the state of the RRC connection to define the level of activity associated to a packet data connection. The key parameters of each state are the required activity and resources within the state and the required signalling prior to the packet transmission. The operator configurable RRC_connection_release timer can be used to release RRC connections in case of very low level of activity and in case the QoS requirements e.g. delay requirement allow the release of the RRC connection.

The cell update and URA update between UE and RNC are used when the UE is in RRC common channel state, i.e., when the above mentioned parameters allow to scale down the resources reserved for the UE (for a more detailed description on this, see [2]). For example, the purpose of the cell update procedure is to allow the UE to inform its current location in the corresponding RRC state. According to [2] the cell update procedure replaces handover in the corresponding RRC substate.

A significant deviation from GPRS is the introduction of the handover procedures for connections supporting traffic into IP domain (in RRC cell connected state, see [2]).

The UE moves to PS-IDLE state in case of expiry of RRC_connection_release timer or an RRC connection failure.

~~4.3.14.4 Issues for further study~~

~~List of issues that are for further study related to this chapter and is the following:~~

~~More details are required with regards to the differences with regards to the "IP-domain" MM compared to GPRS MM, especially considering roaming and handover to/from UMTS to GSM/GPRS.~~

~~More details should be provided with regards to the logical relations between UE-CN and UTRAN-CN, and how these relate to the physical interconnection between UTRAN and the CN nodes(s), namely whether one logical/physical Iu can be used to interconnect the UTRAN with the CN.~~

~~It should be clarified whether this approach allows for the possibility to use a common signalling connection from MSC and/or SGSN to the HLR.~~

4.3.15 Combined update towards the HLR for a combined 3G-(MSC/VLR+SGSN) configuration

Note: Combined location update procedures are not a high priority architectural requirement for UMTS R99.

4.3.15.1 Motivation

In order to optimise the signalling load within the network, reduce operating and maintenance costs and creating the possibility to combine cs and ps handover it is essential to open the door in the specifications for combined 3G-(MSC/VLR+SGSN) solutions.

4.3.15.2 Technical description

For the area concept discussed for the time being, four different cases have to be distinguished:

- change of UTRAN Registration Area (URA) within the same Routing Area (RA)
- change of URA and RA within the same Location Area (LA)
- change of URA, RA, or LA within the same node
- change of URA, RA, or LA, and node

For a combined 3G-(MSC/VLR+SGSN) node only in case 4 the UE's HLR has to be updated. If the UE is idle mode for the packet and circuit switched traffic a combined 3G-(MSC/VLR+SGSN) node will run the location update procedure jointly for the UE's CS and PS domain resulting in one combined location update message, see Figure 4-32.

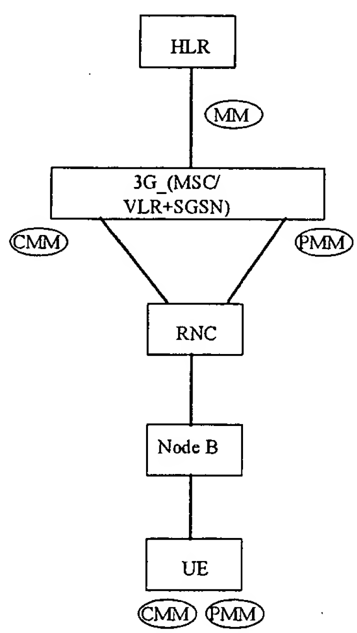

Figure 4-32 Combined MM Instance For a Combined 3G-(MSC/VLR+SGSN) Node

Split nodes may have to run one specific location update procedure for any of the two domains resulting in two separate location update messages, see Figure 4-33.

a) Networks which provide the functionality of CS Service Domain and PS Service Domain.

b) Networks which only provide the functionality of the CS Service Domain.

c) Networks which only provide the functionality of the PS Service Domain.

The following terminal configurations shall be allowed:

a) Terminals which are able to access both to the CS Domain and PS Domain.

b) Terminals which are only able to access to the PS Domain.

c) Terminals which are only able to access to the CS Domain.

It shall be noted that e.g. terminal which is only able to access to the PS Domain supports only mobility management, protocols etc. of that particular domain. The different configurations given above shall not prevent CS-type services from being delivered over the PS domain.

5 UMTS to UMTS handover for circuit switched services

For UMTS to UMTS Inter-MSC Handover the GSM E i/f transporting BSSAP messages with necessary modifications for GSM to UMTS Handover shall be used.

[Ed note: signaling flows are to be provided and be in line with "GSM to UMTS handover for circuit switched services"]

6 Interoperability between GSM and UMTS

The requirements for GSM - UMTS interoperability is defined in 22.129.

~~Transparency [from a users perspective] of roaming and handover~~

~~Re-use of existing subscription profiles~~

~~Note: This list is not exhaustive and is FFS.~~

~~This allows easier management and deployment of a new UMTS network~~.

UMTS is a system supporting handovers between GSM and UMTS in both directions. To support these handovers effectively, the following is required from a dual mode MS/UE supporting simultaneous ISDN/PSTN and packet service in GSM/UMTS:

Depending upon the solution adopted for GSM-UMTS handover, the MS/UE supporting simultaneous ISDN/PSTN and packet service may be required to perform appropriate update into CN depending on the activity of the UE once the handover between GSM and UMTS is completed. This update is needed to avoid any severe interruptions on the accessibility of packet services after the handover.

The nature of the update to be made after the handover in both direction, i.e., from GSM to UMTS and from UMTS to GSM, from MS/UE depends on the activity of the UE in the following way:

ISDN/PSTN connection: RA update only (if RA is changed)

Packet connection: LA and RA update (if RA and LA are changed)

Both ISDN/PSTN and packet connection: RA update only (if RA is changed)

~~If the RA, LA or both LA and RA are not changed the MS/UE behaviour is for further study~~

3GPP TSG SA2#12 **S2-000582**

Tokyo, Japan, March 6th – 9th, 2000

To: **S1, S1 R00 Ad Hoc**

CC : **CN, CN1**

SOURCE: **3GPP SA2**

TITLE: **Definitions for R00**

S2 would like to thank the S1 R00 Ad Hoc for its liaison statement on the domain definitions contained in S1-IP 000070. S2 has now agreed to a set of definitions for use within the R00 work program. These can be found in s2-000537 which is attached to this liaison statement.

S2 has considered S1's proposal to modify the definition of the PS domain, however, S2 has decided that it needs to define a separate subsystem from the PS domain. This new subsystem. IP Multimedia Subsystem, is intended to be independent of the access technology, e.g. PS domain. Hence, it is necessary for the architecture work to distinguish between the PS domain and the IP Multimedia Subsystem. S2 have defined the PS services set which includes the services supported by the IP Multimedia Subsystem and the services supported by the PS domain (IP Connectivity Services). S2 invites S1 to use the terms PS and CS services when classifying their services rather than the domains.

S2 asks that S1 and CN consider these definitions and use them within their own work on R00.

3GPP TSG-SAWG2#12 **_TSGS2#12 S2-000537_**

Tokyo, Japan, March 6th – 9th, 2000

Agenda Item: **R00 Definitions**

Source: **Drafting group**

Title: **Release 2000 Definitions**

Document for: Decission

R00 Definitions

For R99 the term Domain was defined as a grouping of physical entities, due to colliding definition in other standardisation foras, it is suggested to find another wording. Because of our history the term domain will still remain in some definitions.

The following definitions are proposed to be included in TR 23.821 and eventually to be included in TS 23.002.

CS Services: Telecommunication services provided to "POTS" clients via 24.008 CC.

PS Connectivity Services: IP connectivity service provided to IP clients via 24.008 SM.

IM Services: Services that require support on the Call Control level carried on top of the PS connectivity services (this may include an eqvivalent set of services to the relevant subset of CS Services).

PS services: The superset of IM services and PS connectivity Services.

CS CN domain: comprises all core network elements for provision of CS services.

PS CN domain: comprises all core network elements for provision of PS connectivity services.

IM CN subsystem: (IP Multimedia CN domain) comprises all CN elements for provision of IM services

Sevice Subsystem: Comprices all ellements providing capabilities to support operator specific services (e.g. IN and OSA)

External Applications: Applications on an external IP host. PS connectivity external applications access the network via the PS connectivity services. Service Control External Applications access the network via the capabilities of the (IM CN Subsystemdomain)

The **User Equipment domain** encompasses a variety of equipment types with different levels of functionality. These equipment types are referred to as user equipment (terminals), and they may also be compatible with one or more existing access (fixed or radio) interfaces e.g. dual mode UMTS-GSM user equipment. The user equipment includes a removable smart card (USIM) that may be used in different user equipment types. The user equipment is further sub-divided in to the Mobile Equipment (ME) and the User Services Identity Module (USIM). The ME performs radio transmission and contains applications. The mobile equipment may be further sub-divided into several entities, e.g. the one which performs the radio transmission and related functions, Mobile Termination, MT, and the one which contains the end-to-end application or (e.g. laptop connected to a mobile phone), Terminal Equipment (TE). The USIM contains data and procedures that unambiguously and securely identifies it. These functions are typically embedded

in a stand-alone smart card. This device is associated to a given user, and as such allows identifying this user regardless of the ME he uses.

The **Radio Access Network domain** consists of the physical entities, which manage the resources of the radio access network, and provides the user with a mechanism to access the core network. The Access Network Domain comprises roughly the functions specific to the access technology.

Source: TSG SA WG2

Title: Coversheet for 23.121

Agenda Item: 5.2.3

Presentation of Specification to TSG or WG

Presentation to: TSG SA Meeting # 7

Document for presentation: TS 23.121, Version 3.2.0

Presented for: Approval

Abstract of document:

The present document covers issues related to the evolution of the GSM platform towards UMTS with the overall goal of fulfilling the UMTS service requirements, the support of the UMTS role model, support of roaming and support of new functionality, signalling systems and interfaces with respect to the Architecture defined in 23.002.

Changes since last presentation to TSG Meeting # 6:

- RANAP has been selected for Inter 3G MSC SRNS relocation CR 54
- Editorials to remove references to FFS items that have been closed CR 57r1, CR 56
- Editorials to align terminology CR053r1, CR58
- Editorials to remove text duplicated in 23.060 and 23.009 CR59
- Alignment with 23.002 for CBS CR55

Outstanding Issues:

- None

Contentious Issues:

None.